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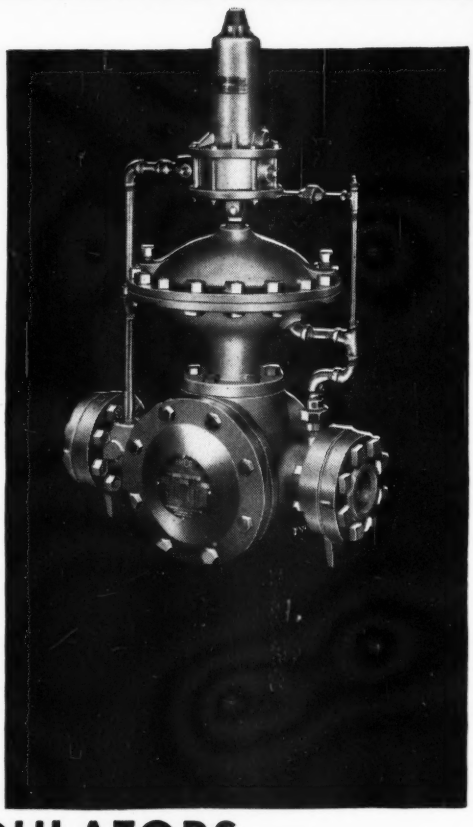

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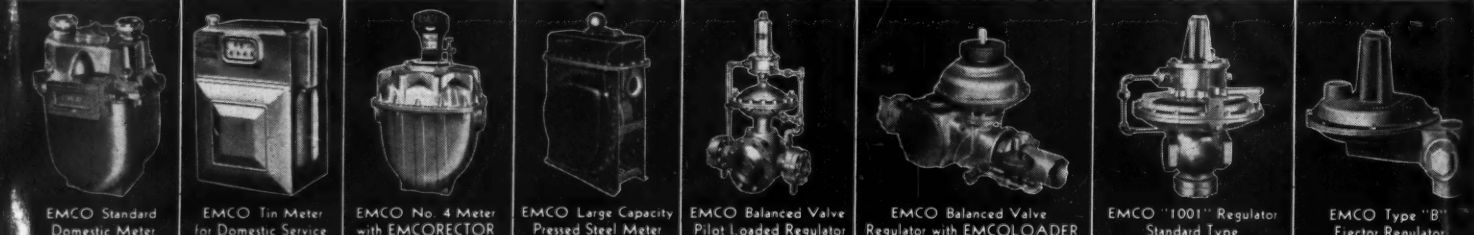

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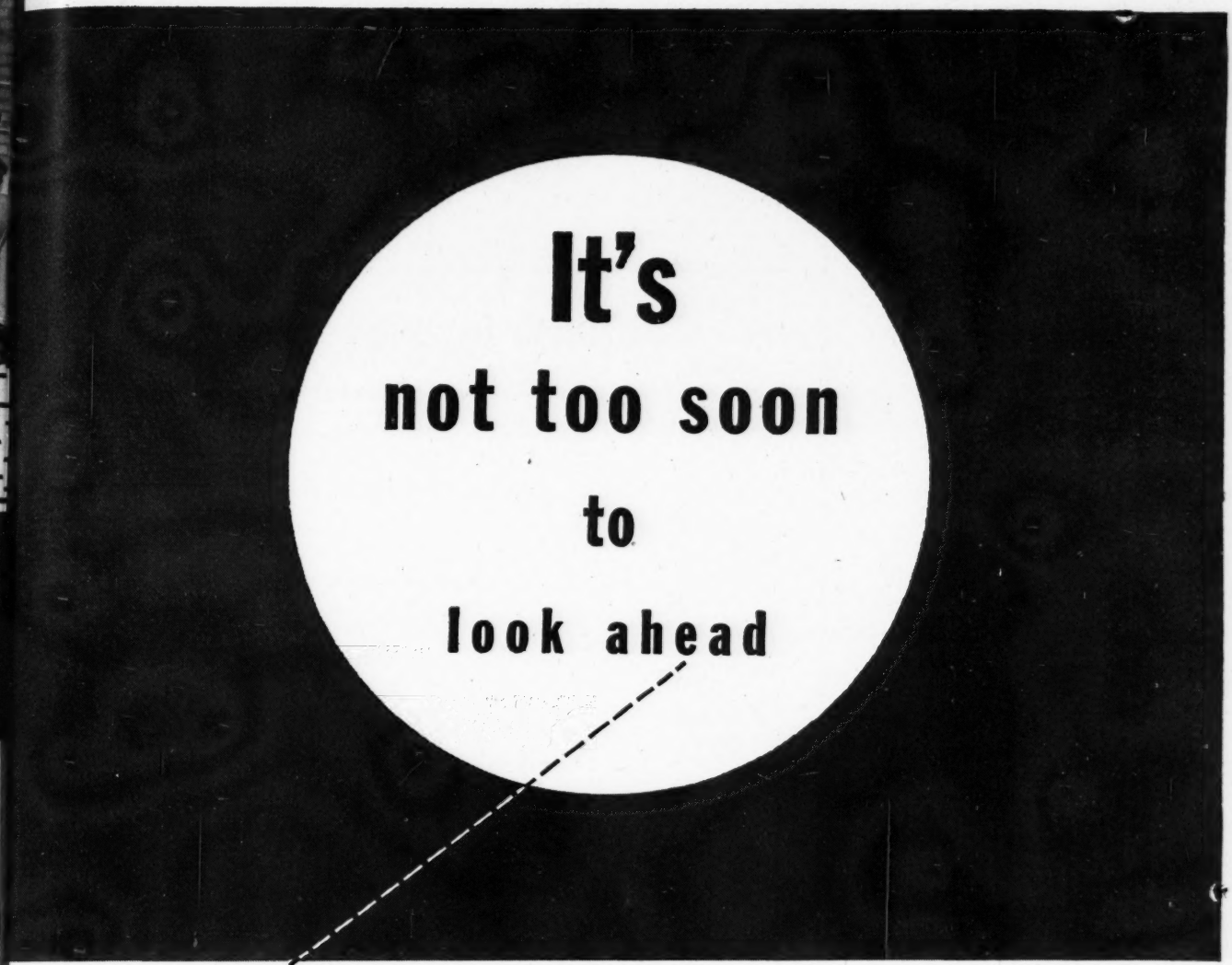

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GAS

REG. U. S. PATENT OFFICE

Twentieth Year of Publication

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Publication Office: **LOS ANGELES 14, California, 1709 West Eighth Street, DRexel 4337.**
Branches: **NEW YORK 17, 50 E. 42nd Street, MUrray Hill 2,4503; WASHINGTON, D. C., 306 National Trust & Savings Building, DIstrict 0215; CHICAGO 3, Illinois, 1064 Peoples Gas Building, HARrison 6634; SAN FRANCISCO 11, California, Tilden Sales Building, 420 Market Street, Room 149, SUtter 8854.**

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November, 1944, Volume XX, Number 11, GAS is published monthly by Western Business Papers, Inc., 1709 West Eighth Street, Suite 320, Los Angeles 14, California. Subscription price: 25 cents the copy; two years for $3; $2 per year; Canada $3 per year. Entered as second-class matter August 20, 1936, at the post office at Los Angeles 14, Calif., under the Act of March 3, 1879. Member: Audit Bureau of Circulation; Associated Business Papers, Inc. Publishers: BUTANE-PROPANE News; Handbook BUTANE-PROPANE GASES; WESTERN METALS.

GUEST EDITORIAL

Let's Turn The Housewife's Fancy to Gas

By H. VINTON POTTER

Director, Coordinated Kitchen Program

THE gas industry has a job to do—in fact several—if we are to maintain our position of leadership in the battle of the fuels that will face us in the postwar era. For too many years our electric competitors have been selling the idea that electricity is a modern fuel. This has now caught the popular fancy to the point where the magic of electricity has biased people's thinking so that little place remains in their thoughts for the good gas service which we are supplying.

To illustrate this, a survey recently conducted by one of the women's magazines asked for an expression of customer preference as to postwar desire for clothes dryers. The vote was overwhelmingly in favor of electricity. The editors, surprised at this trend remarked that "The majority of women voting on these two types of dryers have probably done very little investigation of performance, price or operating costs — but why should eager acceptance mean 9.5% for electric dryers and only 1% for gas dryers? It is hard to explain these figures on logical grounds. One can only say that this unfamiliar product has yielded an extreme illustration of the kind of 'electric fascination' that has permeated the voting in several other lines."

To halt this trend then is one of our big postwar jobs. Nowhere in our industry have we manufacturers comparable in size with those who are promoting the electric story—one more reason why we should give our whole hearted support to the national advertising and promotional program of the gas industry—where the efforts of the large and small can meet on common grounds and tell an effective story to those whom we would serve.

The Postwar Planning Committee set up by the American Gas Association recognized this trend and knew that the battle of the fuels would concentrate on the range in the kitchen. The members of this Committee undoubtedly realized that women would have money to spend when merchandise is again available, and nearly all now cherish the idea that they would either renovate their old kitchens or build a new home where modernity would be the theme.

As a result of this thinking the Coordinated Kitchen Planning Program was set up with the express purpose of removing at the national level those conflicting factors which tend to relegate gas to a past era and then to make available to all gas companies the tools which would make easier their job of showing and selling good gas appliances in attractive settings. No longer will we sell range against range or refrigerator against refrigerator, but rather we will seek to show our appliances in the kind of a kitchen which will capture the fancy of our customers and having honored our appliances through these beautiful pictures we will assure women's loyalty to our service

Representative members of all branches of our industry are guiding the destinies of this program, and to simplify the activity it has been decided that attention would be concentrated on the range and refrigerator, plus the sink and cabinets, which are necessary in our kitchen picture. Manufacturers of water heaters and house heating have graciously endorsed this treatment, feeling that our success in building prestige for gas cooking will assure them a full measure of sales in proportion to our success. Right here I want to pay tribute to the whole hearted support we are getting from many manufacturers who have evidenced a willingness to contribute of their time, money, energy and originality to our program. It now remains for those in the selling and promotional end to justify the optimism of those supplying us the means of utilizing gas in a way that will weave an aura of magic around our fuel.

No national program can hope to provide an adequate solution in every community, but rather will it serve to remove national obstacles and with enthusiastic local backing and a lively promotional program, will assure success at the company level. The Coordinated Kitchen Program will challenge the best thinking that our industry can provide and in showing our customers the most beautiful pictures of gas at work amidst modern surroundings will prove our point that gas is a fuel of the future and that our industry can be relied upon to provide freedom from drudgery, coupled with perfection of results for years to come.

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WE CONGRATULATE the management and engineers of the Tennessee Gas and Transmission Company upon the completion—in record time—of America's longest gas pipe line. And we congratulate them for their confidence in the 24″ x ¼″ high strength, light wall SMITHway Pipe used for 900 miles of this line.

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Thermally Thinking

By ELLIOTT TAYLOR, Washington Editor

8=32

THE Association of Gas Appliance and Equipment Manufacturers has published its answer to the 31 recommendations of the post war planning committee of the American Gas Association. The spirit and tone of the published report is one of harmony with and cooperation in the ambitious plans that are proposed by the utilities.

It is true the 8 comments are freely interlarded with advice from the manufacturers to the utilities, just as the 31 recommendations of the utilities contained many a gratituously erected guide post for the builders of appliances and equipment. But there can be no denying that it is written large in the A. G. A. E. M. report,—the manufacturers are ready to go along on any progressive program that the gas utilities are able to inaugurate with their own members.

Having on one of two occasions had our say on the subject of closer cooperation between all branches of the gas industry, we are pleased to observe that Comment No. 8 is labeled "Cooperation With LP-Gas Industry: We believe the utilities should aggressively set up a policy of cooperating with the liquified petroleum gas industry as the only available means of adequately meeting the encroachment of the competition of other fuels and the future expansion of its own gas service."

It is safe to assume that this cooperation will take the form, among other things, of including mention of LP-Gas "in any gas industry advertising, promotional activity or other organized industry-wide contact with the public . . . as a fuel for homes not served by natural or manufactured gas. . . ." (Recommendation 32, GAS June 1944 P. 9).

J. French Robinson

WITHIN two weeks of the day when he was elevated to the Presidency of the American Gas Association, and a scant 48 hours after he had made his first official address as a representative of the gas industry speaking before a gathering at the metals congress in his home town, Cleveland, Ohio, J. French Robinson, president of the East Ohio Gas Co. was visited by the most devastating stroke of evil fortune that could befall a utility man. His property became the scene of a major disaster, a destructive blast and resulting fire that destroyed most of the new gas storage installation, the American Gas Association laboratory buildings and equipment and reduced hundreds of surrounding buildings to ashes.

We appreciate that under these trying circumstances the new president of the American Gas Association might be prone to conclude that his usefulness to the industry organization had been seriously impaired if not completely destroyed. And we suggest the possibility of this misapprehension only that we may vigorously and categorically reject it.

Extraordinary demands on his time and energies, as an aftermath of the Cleveland misfortune may make it difficult for him to observe some of the meaningless and time wasting amenities that have plagued past presidents of the A. G. A. So much the better if they are eliminated for good. His preoccupation with the rehabilitation of his own company may make it necessary for his committee members and his fellow officers in the association to work a little harder than has been their wont. To most committeemen the assignment to a major task should be a welcome tonic.

French Robinson was elevated to the position of president of the American Gas Association, not only because his labors had earned him the honor; he was selected to head first the newly created Natural Gas Department, and then the whole A. G. A. because the organization desperately needs his services. We believe that more than any single individual he is responsible for restoring a measure of inter-industry accord between natural and manufactured gas interests. Much still remains to be done in this vital field of endeavor, and no one is as well qualified to carry on as is Mr. Robinson.

In times of crisis it well behooves an industry to rally to the support of one of its members with the same selfless devotion that it asks of those who serve it. We believe that now is precisely the time when the steadfastness and the loyalty of the entire gas industry to its own should be manifest in its support of J. French Robinson.

Plunge for Power

THE obvious intention of the Federal Power Commission to establish itself as the ultimate arbiter over the entire natural gas industry through the device of granting or withholding certificates on the basis of the end uses to which the gas transported is likely to be put, has been given one more boost by the commission in the promulgation of its order of September 22 instituting an investigation into "the extent and probable life of natural gas reserves, . . . measures for preventing waste . . . utilization . . . for domestic, commercial and industrial purposes; the extent, character and result of the competition of natural gas with other fuels; and such related matters as may be helpful in the administration of the Natural

Gas Act or in determining what additional legislation, if any, should be recommended."

It would be an idle exercise and a wasteful use of scarce white paper for us to point out that the things the FPC proposes to investigate are,—within the present designations of the Natural Gas Act,—none of the commission's business. The commission is not worried about such trifling niceties, since in January it was able to say that it had no authority over end uses of gas, whereas in June it denied the Memphis Natural Gas Company's petition to enlarge its transmission facilities on the grounds that the end uses were not satisfactory to the commission. Then adding inconsistency to inconsistency, in hearings on appeal in the same case, the trial examiner ruled that evidence on preferential end uses would not be admitted.

Being able thus to move about untrammeled by either consistency or logic, it is small wonder that the commission sees nothing ridiculous in its invitation to the governors, regulatory and conservation commissions of the natural gas states, the Interstate Oil Compact Commission and the natural gas companies, inviting them to suggest ways and means whereby the inquest over their violated rights might best be conducted.

Those who contend that this is a sincere and honest attempt on the part of the commission to bring some order out of the regulatory chaos unto which it has helped to plunge natural gas affairs are, in our opinion, trusting beyond the limits of normal prudence.

A Power Grab, Pure and Simple

This is a power grab pure and simple on the part of the Federal Power Commissioners who, like all incompetents who fail in the performance of a small task, insist loudly that all they need to succeed is still greater responsibility and still more authority.

The commission knows that there is pending before Congress the Overton resolution,—voting on which will give Congress the opportunity of registering its will regarding the Federal Power Commission and its proposed investigation. The commission knows that strong and valid objections to turning the investigation over to FPC have been voiced by the Interior Department. It knows that there is a considerable body of opinion in Congress which believes that if a study of natural gas resources is undertaken it should be entrusted to the Bureau of Mines and the Geological survey,—both agencies that have long established relations with the oil and gas industries, and which have by and at large gained the confidence and respect of natural gas operators.

The commission knows that it hasn't the money to carry through the type of survey and investigation that it now threatens to undertake. The $30,000 appropriation originally proposed in the Overton resolution was considered inadequate by the Senate subcommittee which raised the ante to $100,000 in its favorable report to the Interstate Commerce Committee; but the office of the Secretary of the Interior in identical communications to Congressman Lea and Senator Tunnell estimated that the cost of such a project would be at least $250,000 a year over a four year period that would be required to complete it.

State legislatures, state regulatory and conservation officials, the Interstate Oil Compact and others interested in the establishment of a sound and fair policy of natural gas conservation can only view with indignation and alarm these preliminary maneuvers in a campaign to undo all the beneficial regulations that they have labored to bring about. And the greater must be their honest wrath when they realize, as all must realize, that the primary purpose that animates the commission is that expanding ambition that seems to have overcome all official Washington,—the lust for more power for power's own sake.

In the face of the solid front of non-cooperation that the FPC may expect to encounter as it thus proceeds to invade the rights of industry, to usurp the functions of the state regulatory bodies and to answer only with its own arrogance the objections of the Department of the Interior, what can it hope to accomplish with the limited manpower and the limited budget that can be made available? The answer to that is obvious. The commission knows that it cannot possibly finish the investigation that it has outlined on its own inadequate funds. Thus undertaking the job is disclosed as nothing more than a political maneuver designed to preempt the activity from other agencies and to set up a semblance of an unfinished undertaking to be used as a justification for the inevitable requests for additional appropriations.

The Commission's Record

The while the commission looks for new horizons to which it may extend its authority it has been notoriously and flagrantly derelict in the execution of the responsibilities already imposed on it by the amended Natural Gas Act.

In just one matter alone, the failure to define service areas as contemplated under Section 7(f), the commission has wilfully and deliberately refrained from simplifying and rationalizing its relations with the natural gas utilities. The law specifies that the commission may determine service areas within which a "natural gas company may enlarge or extend its facilities for the purpose of supplying increased market demands" without certificates.

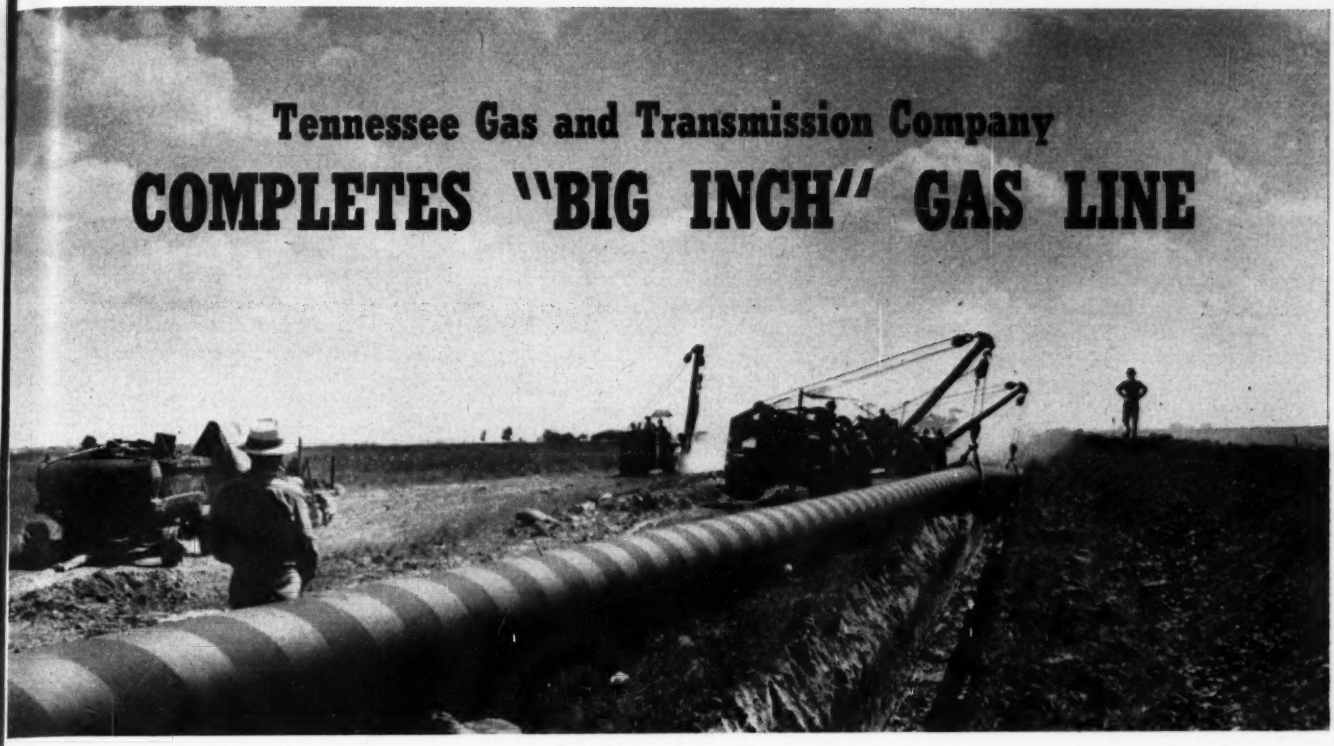
Not one single service area has been defined, due, according to the commission in its report to Congress "to the limited staff available to the commission . . . and the subsequent imposition of urgent war problems. . . ." The end project is that every contemplated addition to facilities must be made the subject of an application for a certificate, and must go through the time and money-wasting formality of a hearing on its necessity.

Examples of the low buffoonery to which certificate applications have sunk may be culled from the commission's news release No. 2536 (G-625). Dates were set for hearings on two dockets, Nos. G-560 and G-562. And here is what the commission was being called on to decide: whether a 400 horsepower compressor unit could be installed alongside existing compressor facilities in a station in Wheeler County, Texas; and if it would be all right for the gas company to construct and operate 2½ miles of 6⅝ inch line connecting to certain existing lines in Cowley County, Kansas.

If the commission is too short of manpower to bring to an end this wasteful perpetuation of its petty tyranny by defining service areas, we submit that it is hardly staffed sufficiently to undertake a sweeping investigation of the entire natural gas industry. We agree that the Natural Gas Act and the natural gas industry which it is designed to regulate should one day be made the subject of a complete and searching investigation. But it must be an investigation by a specially appointed congressional committee, and one of the first things the committee will have to investigate will be the personnel, the procedure and the record of the Federal Power Commission.

Tennessee Gas and Transmission Company

COMPLETES "BIG INCH" GAS LINE



THE original corporate charter for the Tennessee Gas and Transmission Company, a Tennessee corporation, was obtained by a group in the State of Tennessee on April 1, 1940, for the purpose of constructing, owning and operating a natural gas pipeline with the intent to serve certain localities in the States of Tennessee and Alabama. The initial application for a Certificate of Public Necessity and Convenience was filed with the Federal Power Commission on April 26, 1940.

Purpose of the Project: During the progress of hearings on the application to FPC which were held by the Commission in 1943, it became apparent that the increasing demand for fuel gas in the Appalachian area, coupled with the diminishing reserves of gas in that area, would create a severe slowdown in the war effort in the coming winter of 1944-45. Tennessee Gas and Transmission then amended its application to meet this problem by extending its proposed line into West Virginia.

Until June 29, 1943, the only application pending before the Federal Power Commission for a permit to construct and operate natural gas lines that would be able to relieve this gas shortage, was that of the Tennessee Gas and Transmission Company. On June 29, 1943, the Hope Natural Gas Co. filed an application for this same purpose, but with gas to be obtained in the Hugoton Field in Kansas.

It had been determined by the Federal Power Commission and the War Production Board that an additional 200,000 Mcf gas daily would be required, and to do this, more than 1200 miles of pipe line must be laid.

Action by WPB: On August 28, 1943, WPB ruled in a letter to FPC that a new natural gas supply must be obtained for the Appalachian area as an essential part of the war program. Excerpts from the text of WPB's letter follows:

1. A new transmission line must be built, as an essential part of the war program, to augment natural gas supply into the Appalachian area.
2. The new line must be completed in time for operation during the winter of 1944-45 in order to prevent interruption in war production that would otherwise occur.
3. A program determination has been made by the War Production Board authorizing the issuance of a AA-3 priority for a line, and contemplating that materials will be made available commencing in the fourth quarter of this year.
4. Either the Tennessee or the Hope project would provide an effective means of safeguarding gas supply for the Appalachian area. Neither project has a substantial advantage over the other in terms of materials, equipment, deliverability or any other factor which the War Production Board has responsibility to appraise.

"Accordingly, the decisive factors in determining a project sponsor relate to the long-term public interest and other issues for which the Federal Power Commission has responsibility under the Natural Gas Act. The War Production Board will, therefore, act favorably on whichever project the Commission determines should be constructed in the discharge of its duties under that Act."

As GAS goes to press word was received that Tennessee Gas and Transmission Company completed welding of the line at 7 p. m., Oct. 29. First gas was delivered at 12:30, Oct. 31. The line will hold about 800 million cubic feet at 750 pounds pressure.

Application Granted by FPC: On September 8, hearing of the Tennessee Gas and Transmission Co. was reconvened for the purpose of presenting evidence that requirements of the Commission set forth in their Opinion 93, dated July 5, 1943, had been met.

At this hearing Richard Wagner, president of The Chicago Corporation, testified that his corporation had made a firm commitment to Tennessee Gas and Transmission Company for an adequate supply of gas from reserves which it owned or controlled which were in excess of two trillion cu. ft. Subject to ratification of the stockholders of Tennessee Gas and Transmission Company, The Chicago Corporation agreed, among other things, to cause Tennessee Gas and Transmission Company to be adequately financed for the completion of the project.

Subsequently, the Gulf States Oil Co. with reserves of approximately one trillion cu. ft. of gas in the San Salvador Field made their reserves available to the project, and became

PROGRESS DATES

1943

August 28. The War Production Board announced the necessity of a project to deliver additional gas in the Appalachian area in connection with the war program.

September 7. Contract between The Chicago Corporation and Tennessee Gas and Transmission Company effective.

September 20. The Chicago Corporation purchased 90% of the stock of Tennessee Gas and Transmission Company.

September 24. The Federal Power Commission issued a Certificate of Public Convenience and Necessity to Tennessee Gas and Transmission Company to construct a natural gas pipe line from Southwest Texas to the Appalachian area.

October 1. Orders for major equipment had been placed with the manufacturers.

October 2. Temporary offices were established in Houston, Texas.

October 25. Gas sales contract executed with Hope Natural Gas Company.

November 5. River crossing and main line contractors selected and tentative contracts outlined.

November 23. First pipe shipped from from the mills.

December 4. Ceremony at Cumberland River in Tennessee to commemorate initial construction program.

1944

January 10. First main line pipe welded.

January 29. Gas sales contract executed with United Fuel Gas Company.

January 31. First compressor shipped by the manufacturer.

March 1. Gas purchase agreement executed with Gulf States Oil Company.

July 20. Last compressor shipped by the manufacturer.

September 1. Last pipe shipped from the mills.

October 29. Final tie-in weld made in the state of Tennessee.

October 31. First gas delivered.

interested in the project to the extent of 10% of The Chicago Corp.'s commitments on the same terms and conditions.

On September 20, 1943, the stockholders of Tennessee Gas approved the aforementioned contract with The Chicago Corporation, and on Septembre 24, 1943, the Federal Power Commission issued its formal order "issuing certificate of public convenience and necessity."

Financing: The Chicago Corporation with assets in excess of $36,000,000 and with stockholders numbering more than 25,000, none of whom owns as much as 3% of the outstanding capital stock, has a large portion of its assets invested in oil and gas properties in Texas.

In 1938 it invested approximately $500,000 in the first commercial recycling plant which was built to extract liquid hydrocarbons from wet gas and to return the residue to the gas sands. Since 1938 The Chicago Corporation has invested all of its cash income from its properties and plants in Texas and additional large sums in extensions of its activities in the State. It owns two recycling plants and a substantial interest in a third plant. These plants account for approximately 8000 barrels daily of liquid hydrocarbons from wet gas. The company also has substantial production of crude oil both directly and through certain subsidiaries.

The desire of the company to develop a commercial market for residue gas for which no satisfactory market existed in Southwest Texas led it to become interested in the pipeline project of Tennessee Gas and Transmission Company. When it became apparent that not only could a market be developed through this means for its own holdings of natural gas, but that also a substantial contribution could be made toward the war effort, the commitment to finance and construct the pipeline was undertaken.

It is the belief of the Management of The Chicago Corporation and of the Tennessee Gas and Transmission Company that by establishing a satisfactory market for gas in the Southwest area of Texas real conservation of gas can be implemented and actual results accomplished. To this end installations are being made in the Agua Dulce area for the purpose of saving and recompressing gas which has heretofore been vented in connection with the production of oil.

Preliminary Problems: The Chicago Corporation on September 24, 1943, found itself faced with the problem of setting up an organization for Tennessee Gas and Transmission Company, securing necessary personnel, ordering materials in advance of construction, planning and engineering, mapping, surveying and obtaining necessary rights of way, and engineering the construction of 1265 miles of pipeline before the winter of 1944-45, a period approximately of 365 days. The line traverses seven states and every river from the Rio Grande to the Shenandoah, and the terrain is through the swamps and thickets of East Texas, Louisiana, Arkansas and Mississippi and over the rolling limestone hills of Tennessee, Kentucky and West Virginia.

It was necessary that all phases of the work begin simultaneously and proceed with the utmost speed. The problems involved the surveying and mapping of the line over a territory involving every type of terrain, crossing of 67 major rivers and streams, 24 of which required special installations. Approximately 700 miles of forest and heavy undergrowth, 400 miles of rock and many swamps and lowlands had to be crossed and it was necessary to avoid dangerous cliffs and precipices in the 600-mile section from Batesville, Mississippi, to Cornwell, West Virginia.

After locating the route of the line, it was necessary to contact approximately 12,000 landowners and acquire the right and permission to cross their properties and to examine and clear title of these permits in 71 county seats in 7 states.

Management Personnel: Gardiner Symonds, vice president of The Chicago Corporation, in charge of its Oil and Gas Division, was chosen to manage the project and was elected president of Tennessee Gas and Transmission Company.

Mr. Symonds immediately drafted the services of Ray C. Fish from The Stearns-Roger Manufacturing Co. as vice president in charge of engineering and construction; and transferred from the Oil and Gas Division of The Chicago Corporation W. E. Mueller as vice president and treasurer, W. C. Norman as assistant secretary and assistant treasurer, R G. Rice as assistant secretary, Harold Burrow as purchasing agent, George Mayes, as chief warehouseman and Charles S. Coates, who has functioned as one of the district and division superintendents.

Later Binford Arney and C. C. Small, Jr. were borrowed from the firm of Small, Arney, and Small, state counsel, to head up the legal, land and right of way department, Mr. Arney as vice president and Mr. Small as manager of the land and right of way department. With this group as a nucleus, the newly formed Tennessee Gas and Transmission Company had begun to operate by October 1.

Construction and Operating Personnel: During the months of October and November, 1943, key personnel were selected for all departments. Mr. Fish acquired the services of J. P. Bristow as chief engineer and K. N. Fancher as pipeline superinten-

dent, both formerly with Northern Natural Gas Co.; Hiram Moore from Lone Star Gas Co. as compressor station superintendent; G. H. McKay formerly consulting engineer for the Office of War Utilities of the War Production Board as assistant; Tod Pazdral, C. W. Smith, George E. Casey, B. J. Davis, Ed Erwin and W. E. Fahey as division superintendents in charge of inspection; E. N. Armstrong, N. D. Linger and many others well known in pipeline construction and to the gas industry

E. C. Link, Jr. came from the "Big-Inch" as traffic manager; N. W. Freeman was hired as personnel director; Charles A. Lingo as assistant manager of the land department; and Marshall F. Lerch as chief expediter.

On August 1, 1944, as an important step in the transition period between construction of the pipeline facilities and the development of an operating organization, J. P. Bristow was made manager of transmission; William B. Poor, formerly supervising engineer for United Gas Pipe Line Co., joined the company as chief engineer; Carl Myers, formerly treasurer of Iowa Electric Light and Power Co., joined the company as controller; and C. C. Hale formerly of Arthur Anderson & Company became head of the treasury department.

Before October 1, 1943, orders for all major materials for the project had been placed, and before October 15 offices had been established in Houston, Texas. Contractors for the construction of compressor stations, main line construction and installation of river crossings were selected early in November.

The original schedule, as set up, called for 14 main pipeline spreads with the first pipe to be laid in January, exclusive of 85 miles of 20-in. pipeline in the State of West Virginia, and to be completed in September, 1944.

Due to heavy rains throughout the first four months of 1944, only 76 miles of pipe had been laid by April 30. At that time, in order to complete the project by its scheduled completion date and to include the laying of 85 miles of 20-in. line in West Virginia, it was necessary to increase the number of pipeline spreads to a total of 23, employing with other contract work from 9000 to 11,000 men and involving roughly 25,000,000 manhours of labor.

The first pipe was welded on January 10, 1944, and on October 29, 1944, the final tie-in weld was made in the State of Tennessee.

SUMMARY of ENGINEERING ASPECTS

THIS summary of the engineering design of Tennessee Gas and Transmission Co.'s natural gas transmission system from the natural gas reserves in Nueces County, Texas, to Cornwell Station, West Virginia, embraces the selection of route and the design of all phases of the project. Discussion of the compressor plants, the dehydration station, and of the use of the pressure weld method of pipeline construction are covered in separate articles in this issue.

The system is designed to gather residue gas from the Wardner, the Coastal and the Gulf Plains Recycling Plants and to transport it to a dehydration plant, then to the main line for transportation east. The capacity of the system is based upon recommendations by the War Production Board. It is designed under the initial operation to transport 207,000 Mcf of gas per day into Compressor Station No. 14 at a pressure base of 14.73 psi, and under the ultimate operation to deliver 262,000 Mcf of gas per day. The maximum operating pressure is 750 psi gauge.

The main features of the design of the system are 1180 miles of 24-in. pipe; 85 miles of 20-in. pipe; seven compressor stations containing 58,000 installed compressor horsepower under the initial design, and 14 stations containing 118,000 installed compressor horsepower under the ultimate design; a dehydration plant with a capacity ranging from 225,000 Mcf to 300,000 Mcf; employee housing where required; and all other facilities for making the system a complete operating unit.

The design of all the component parts is the result of detailed engineering calculations. These calculations embrace the determination of pipe, size of wall thickness, working pressure, number and location of compressor stations and all other phases of the project.

Route: The route of the pipe line system begins at a point near Pintas Creek, Nueces County, Texas, and extends to Hope Natural Gas Co.'s Cornwell Station, approximately five miles east of Clendenin, W. Va.

Beginning at Pintas Creek, Texas, the line traverses the southern part of Texas in a northeasterly direction just north of Houston; the State of Louisiana south of Shreveport and north of Monroe and crosses the Mississippi river at Greenville, Mississippi. From the Mississippi river the line continues in a northeasterly direction traversing the State of Mississippi slightly north of Batesville, the State of Tennessee north of Nashville, to a point near Danville, Kentucky. At Danville the route takes a turn more to the east to a point 14 miles below Catlettsburg, W. Va.

At this point the size of the line changes from 24-in. to 20-in. pipe and traverses West Virginia in a northeasterly direction to Cornwell Station, W. Va. The total length of the line is 1265 miles, consisting of 1180 miles of 24-in. and 85 miles of 20-in.pipe.

Operating Pressure: The 24-in. pipe will operate under a maximum pressure of 750 psi gauge; and the 20-in. pipe under a maximum pressure of 912 psi gauge. Operating at these pressures the safety factor of the pipe will be 1.4 on the yield point and 1.95 on the bursting strength.

The American Standards Association's Code for Pressure Piping (Gas and Air Piping), Division 2, states that pipe may be operated up to 80% of the mill test. The Tennessee has required that all pipe be tested to 90% of the yield point. Therefore, with the above specifications the pipeline was designed to operate at a maximum pressure of 72% of the yield point of the steel.

INNOVATIONS AND ENGINEERING ITEMS OF INTEREST

Pipeline

(1) Presure welding.

(2) Cold wrinkle bending of pipe.

(3) Pig used to clean inside of pipe.

(4) Stearns Holiday Detector used to test pipe coatings.

(5) Pipeline is welded throughout. No gasket type couplings or flanges used.

(6) Main line valve assemblies and river crossing headers completely prefabricated.

(7) Installation of pipe on the Greenville, Miss. River bridge using aluminum alloy brackets and rollers.

Compressor Stations

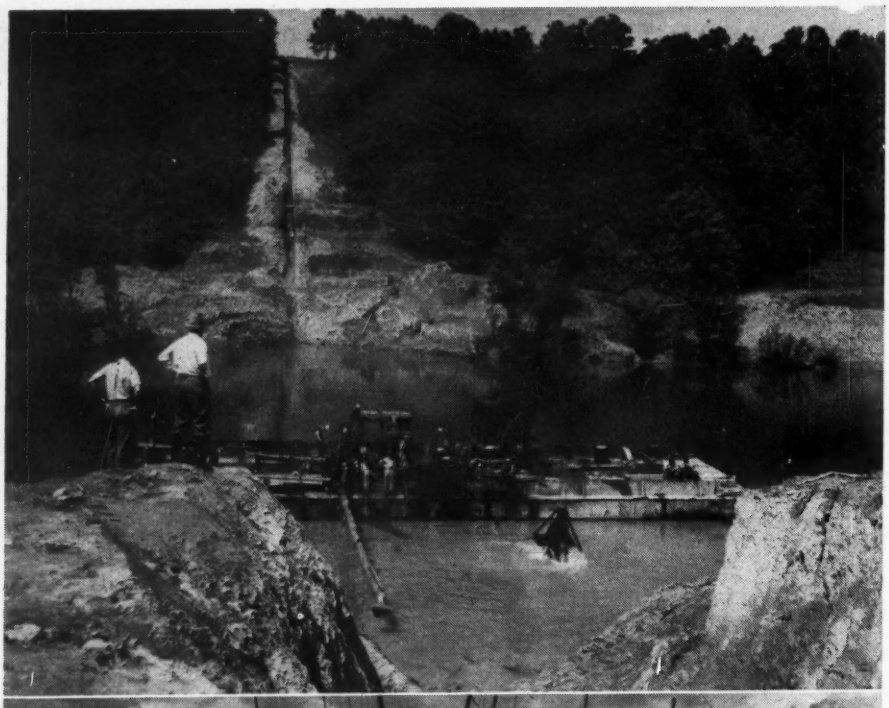
(1) Angle and V-type compressor units.

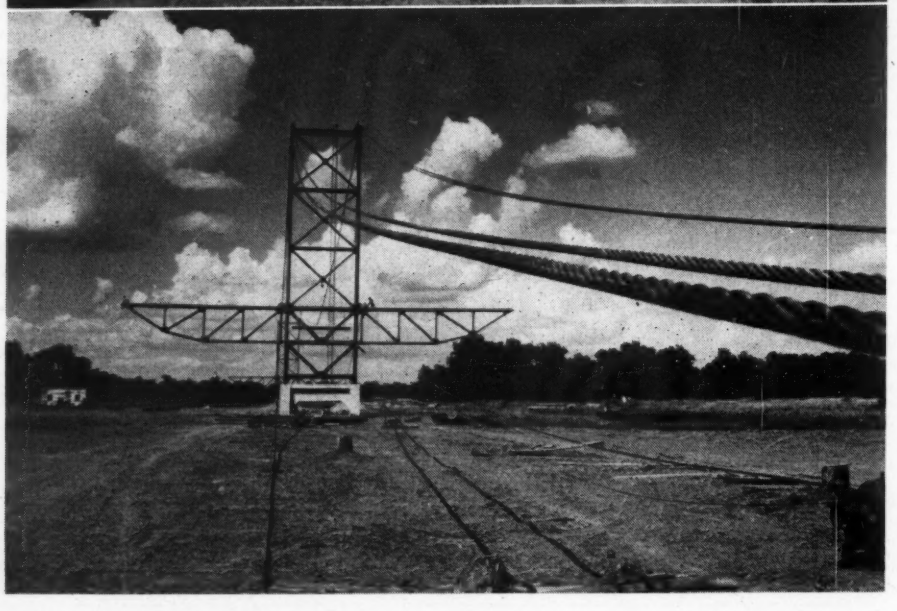
(2) Jacket water piping completely enclosed and consisting of two sections:
a. Cold system for lubricating oil
b. Warm system for engine jackets
Has temperature controllers for maintaining uniform temperature.

(3) Rectox units for ignition system of all compressor units.

(4) System for reconditioning of oil while plant is in full operation.

(5) Each station is a complete self-contained plant.





The War Production Board in an effort to reduce the steel tonnage required the pipeline to be constructed of a steel containing a high manganese content and a high yield point. However, due to the availability of manufacturing facilities they required that 300 miles of the 24-in. pipe and all of the 20-in. pipe be made in a mill in which the highest yield point available was 45,000 lbs. and 900 miles of the 24-in. pipe made in a mill in which the yield point available was 50,000 lbs.

Barlow's formula, which is as follows, was used in calculating the wall thickness required for the two sizes of pipe:

$$P = \frac{2\,ft}{D}$$

D = Outside diameter of pipe
t = Nominal thickness of wall in inches
P = Internal pressure in lbs. per sq. in.
f = Fibre stress in pounds per sq. in.

Fibre stress can equal the yield point or the tensile strength of the steel.

The wall thickness required in the 24-in. pipe made of steel with a yield point of 50,000 lbs. is 1/4-in. and that made of a steel with 45,000 lbs is 9/32-in., and the 20-in. pipe made of steel with a yield point of 45,000 is 9/32-in.

That section of the main line using 20-in. pipe is designed for 912 psi maximum operating pressure so that in case of an emergency and in the anticipation of the ultimate design the full load of the line can be carried in this section. The terrain traversed by the 20-in. section is mountainous and the thicker wall pipe lends itself better to field bending and the type of construction which is necessary in this country.

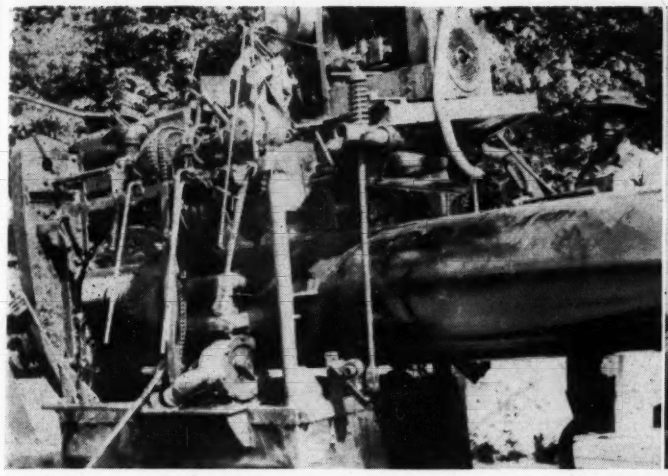
Capacity: The capacity of the pipeline system into Compressor Station No. 14 under the initial design is 207,000 Mcf per day at a pressure base of 14.73 and under the ultimate design is 262,000 Mcf per day.

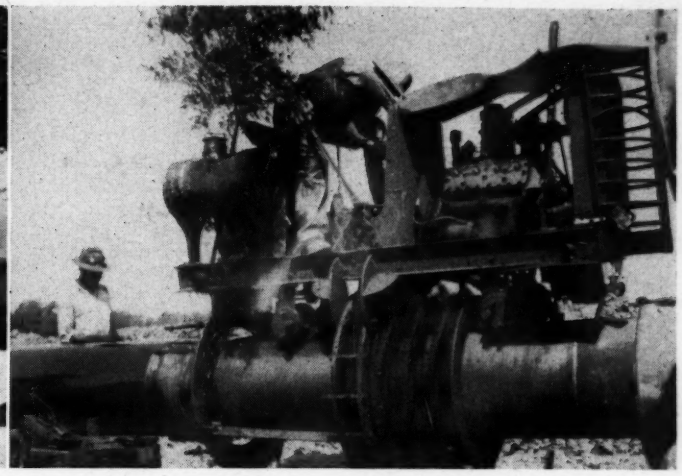
The capacity of the 20-in. section of the main line from Compressor Station No. 14 to Cornwell Station, W. Va., operating under the initial design of 750 psi at Compressor Station 14 and 475 psi at Cornwell Station will be from 155,000 to 165,000 Mcf per day at a pressure base of 14.73. Under the ultimate design with 912 psi at Compressor Station 14

TOP
Crew at work on the Kentucky River crossing.

CENTER
Suspension crossing, Brazos River, Texas

BELOW
Approach to the Brazos River crossing.





LEFT: Close-up of Perrault Bros. coating and wrapping machine. RIGHT: Cleaning and priming machine.

and 475 psi at Cornwell Station, the capacity will be 237,000 Mcf per day.

Before designing the pipeline system all the major gas transportation companies were contacted in order to find the most adaptable flow formula. After contacting these companies and the major consulting engineers on this subject, it was found that the Panhandle formula more accurately indicates the actual flow of gas in pipe lines. The Panhandle formula is an improvement of the Weymouth formula based on experience the Panhandle Eastern Gas Co. has had on their transmission system.

The formula, adjusted for flow conditions that will be encountered in operating the Tennessee Gas and Transmission Co.'s line; namely,

Flowing temperature 75° F, or 535° absolute
Temperature base of 60° F, or 520° absolute
Pressure base of 14.73 psi absolute
Gravity .60
Efficiency factor .95
is as follows:

$$Q = 826.75 \left\{ \frac{P_1^2 - P_2^2}{L} \right\}^{.5394} d^{2.6182}$$

The initial design of the pipeline system and the installation of the facilities for this capacity are such that to reach the ultimate capacity it will be a simple matter of placing compressor stations approximately halfway between those installed under the initial design.

Feeder System: The Feeder System is designed to operate at a capacity ranging from 225,000 Mcf to 300,000 Mcf per day and connects the Wardner, the Gulf Plains and the Coastal Recycling Plants into the Dehydration Plant. It consists of 15,500 ft. of 12¾x.340-in. pipe and 25,500 ft. of 18x⅜-in. pipe and 6000 ft. of 10¾x5/16-in. pipe.

The system is designed to operate with a 1000 psi pressure gauge at the Wardner and Gulf Plains Recycling Plants and 900 psi pressure gauge at the Coastal Recycling Plant deliver-

SUMMARY OF SPECIFICATIONS OF THE TENNESSEE GAS AND TRANSMISSION CO. SYSTEM

Length—Miles

Main Line—24" pipe	1180
Main Line—20" pipe	85

Pressures

Maximum Operating Pressure—24"	750 psi gauge
Terminus Pressure	475 psi gauge
Compressor Station Suction Pressure	400 psi gauge
Compressor Station Discharge Pressure	750 psi gauge

Capacity

Initial Design	207,000 Mcf
Ultimate Design	262,000 Mcf

Cubic Foot

Absolute Pressure	14.73 psi
Temperature	60° F or 520° Absolute
Gravity	.60

Pipeline

Welded Construction Throughout

Outside diameter	24"	24"	20"
Wall thickness	9/32"	1/4"	9/32"
Miles	300	880	85
Minimum yield point	55,000#	50,000#	45,000#
Minimum tensile strength	70,000#	70,000#	70,000#
Bursting pressure	1,641#	1,458#	1,968#
Yield pressure	1,055#	1,042#	1,265#
Safety factor on yield point	1.4	1.39	1.67
Safety factor on tensile strength	2.19	1.95	2.62
Pipe weight per mile of line (tons)	188.1	167.41	156.37

Coatings

	24"
Miles	1079
Coats of primer	1
Coats of enamel	1
Felt wrapper	1

Compressor Stations

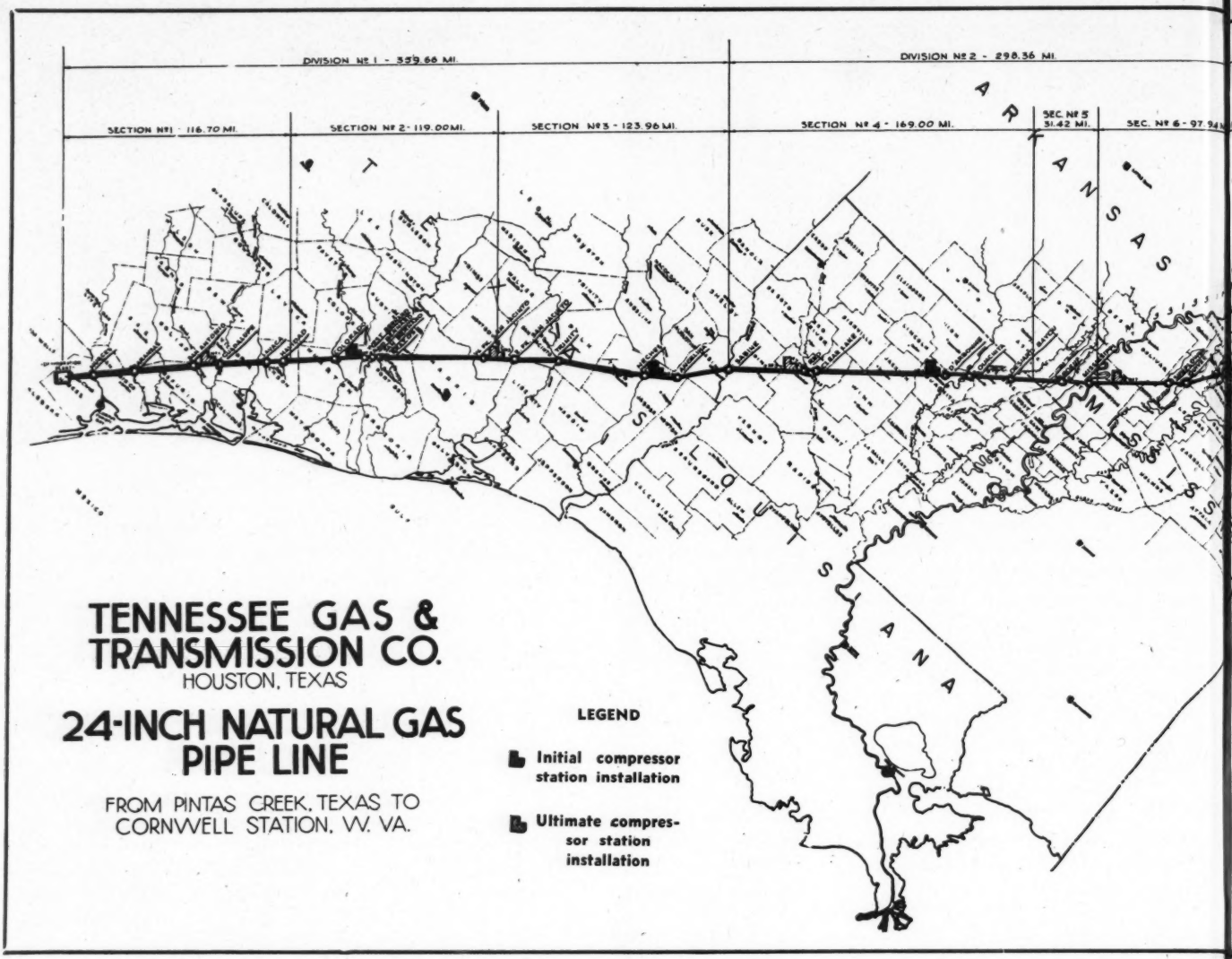
	Initial	*Ultimate*
Number of stations	7	14
Spacing, approximate miles	170	85
Total number of units	58	118
Total installed horsepower	58,000	118,000
Compressor ratio, average	1.83	1.54
System fuel consumption per day (12 cu. ft. per horsepower hour operated) Peak load conditions (Mcf)	16,704	33,984

Gas Measuring Stations

Purchase gas stations	3
Check meter stations	3
Sales meter stations	3

Main Line Valves

	24"	20"
Type	Lubricated plug valves, with welding ends	
Average spacing (miles)	10	10
Total to be installed	141	8


DIVISION Nº 1 - 339.66 MI.
DIVISION Nº 2 - 298.36 MI.
SECTION Nº1 - 116.70 MI.
SECTION Nº 2 - 119.00 MI.
SECTION Nº3 - 123.96 MI.
SECTION Nº 4 - 169.00 MI.
SEC. Nº 5 31.42 MI.
SEC. Nº 6 - 97.94 MI.
TENNESSEE GAS & TRANSMISSION CO.
HOUSTON, TEXAS
24-INCH NATURAL GAS PIPE LINE
FROM PINTAS CREEK, TEXAS TO CORNWELL STATION, W. VA.
LEGEND
Initial compressor station installation
Ultimate compressor station installation

ing gas into the Dehydration Plant at 800 psi gauge

Main Line Block Valves: The pipe line system will be equipped with main line size worm gear operated Merco Nordstrom welded and lubricated plug valves installed at an average spacing of 10 miles. This spacing of the valves provides an isolation of any 10-mile section of line for maintenance and/or repairs.

These valves were selected in order to have an immediate and accurate shut-off under any condition and to have a minimum pressure drop through the valves. These valves, although main line size, have a restricted area through the plug, but they are designed so that there is a venturi effect of the flow of gas through the valves thereby producing a minimum pressure drop. Welded end valves were specified to eliminate flanges, gaskets, and alloy studs and nuts.

The valves, with water-tight seven-foot gear extension, permit their installation without the use of valve boxes. These valves are to be assembled and prefabricated and shipped for installation in the main line with a minimum of field welds. The weld between the valve and the main line nipple will be X-rayed before shipment. When critical materials and fabricated facilities are available these valves will be equipped with automatic shut-off devices.

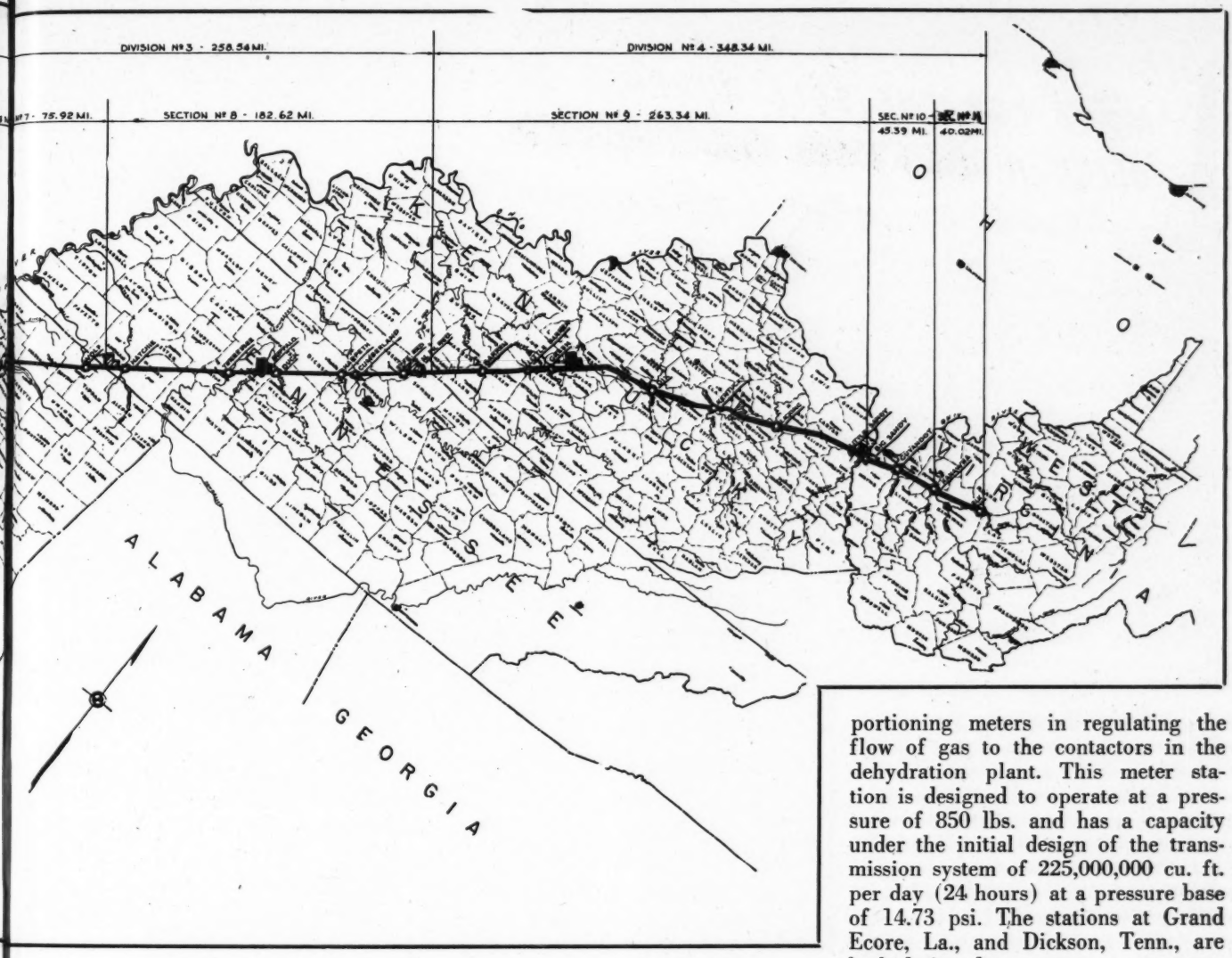
Coatings and Wrapping: The pipeline will be coated with one coat of primer and one coat of coal tar enamel and wrapped with asbestos felt from Corpus Christi, Texas, to the Dix river in Kentucky, a distance of 1045 miles. The soil in this area is classified as very corrosive to medium corrosive. Approximately 34 miles in low areas in Kentucky will be coated and wrapped. These low areas in Kentucky are approximately 24 miles in Clark, Powell, Montgomery and Menifee Counties, 7 miles in Carter County and 3 miles in Boyd County.

All pipe in river crossings will be coated with coal tar enamel and two asbestos wrappers applied over the coating and that portion of the pipe immediately under the river weights will be wrapped with four additional layers of pipe wrapper.

The remainder of the line will be laid bare because the history of pipelines in that area indicates that there will be very little trouble from corrosive conditions. In selecting that section of the pipeline system to be coated and wrapped, a survey was made, taking into consideration soil conditions and past history of pipelines in the area the line traverses.

Cathodic Protection: Cathodic protection will be installed on that portion of the line laid in areas where corrosive conditions are known to exist or laid adjacent to pipelines that now have cathodic protection. The section from Corpus Christi, Texas, to Memphis, Tenn., is considered to be very corrosive and cathodic protection is now installed on other pipelines in this area. Therefore, cathodic protection will be placed on this section of the line immediately. Cathodic protection will be postponed on the remainder of the line until such time as survey indicates that corrosive conditions exist.

Gas Measurement Stations: The three types of measuring stations being constructed on the pipeline system



are purchase gas meter stations, Sales Meter Stations and Check Meter Stations.

The three initial purchase gas measuring stations are located in Nueces County, Texas. Each of the purchase gas measuring stations at the Wardner and Gulf Plains recycling plants is designed to operate under the initial design of the transmission system at a capacity of 100,000,000 cu. ft. of gas per day (24 hours) at a pressure base of 16.7 psi. The measuring station at the Coastal Recycling Plant is designed to operate under the initial design of the transmission system at a capacity of 25,000,000 cu. ft. of gas per day (24 hours) at a base of 16.7 psi.

There are three sales meter stations on the pipeline system, two for deliveries to the United Fuel Gas Co. and one for the delivery to the Hope Natural Gas Co. The station located at the discharge of Compressor Station No. 14 is to deliver gas to the United Fuel Gas Co. at a pressure of 475 lbs. psig and is designed to handle between 35,000,000 and 45,000,000 cu. ft. of gas per day (24 hours) at a pressure base of 15.025 psi.

Two of the sales measuring stations are located near the point at which the 20-in. main line pipe crosses the United Fuel Gas Co.'s S-7 12-in. line near Clendenin, W. Va. One of these stations is designed to deliver gas to the United Fuel Gas Co at a pressure of 475 psi gauge and at a capacity of 55,000,000 to 65,000,000 cu. ft. of gas per day (24 hours) at a pressure base of 15.025 psi.

The other station is to deliver gas to the Hope Natural Gas Co. at their Cornwell Station, approximately three miles from this location, at a pressure of 475 psi gauge and at a capacity of 100,000,000 cu. ft. of gas per day (24 hours) at a pressure base of 15.025 psi.

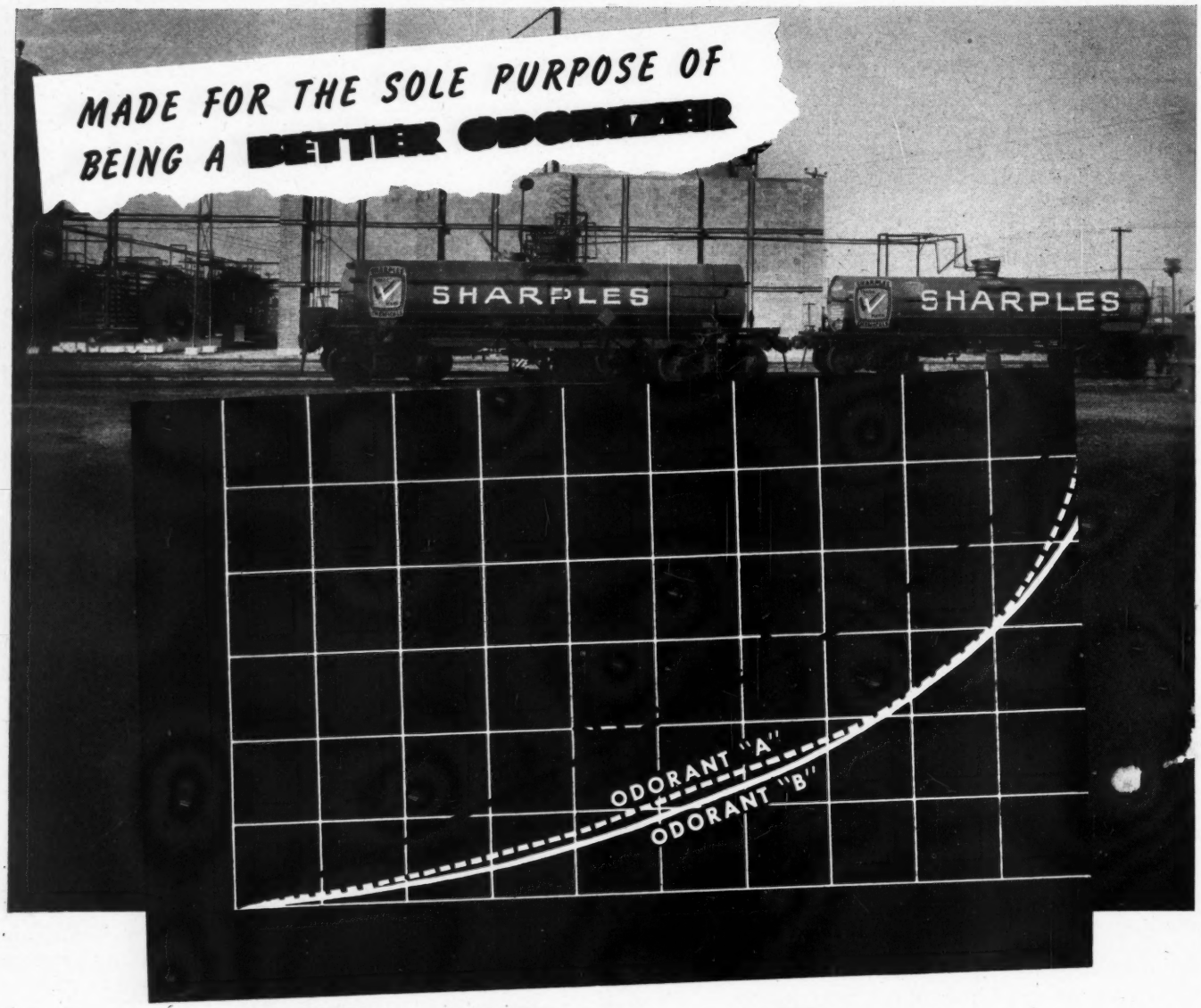
The three check meter stations are located at the dehydration plant near Pintas Creek, Nueces County, Texas; near Grand Ecore, La.; and near Dickson, Tenn.

The check meter station at the dehydration plant not only acts as a check meter station, but also as proportioning meters in regulating the flow of gas to the contactors in the dehydration plant. This meter station is designed to operate at a pressure of 850 lbs. and has a capacity under the initial design of the transmission system of 225,000,000 cu. ft. per day (24 hours) at a pressure base of 14.73 psi. The stations at Grand Ecore, La., and Dickson, Tenn., are both designed to operate at a pressure of 750 lbs and at a capacity ranging from 225,000 Mcf to 300,000 Mcf per day at a pressure base of 14.73. These stations are installed on the transmission system to provide a check on the amount of gas handled and to provide a means of isolating the leakage on the system.

The gas used as fuel at the plants and in the cottages will be measured. Proportioning meters will be placed on the scrubbers at the inlet of each compressor station to distribute the load to the scrubbers and charts from the proportioning meters can be used as a station operating control check on the flow of gas into the plant.

River Crossings: On the minor and less harzadous streams a single submerged crossing will be used, in which the outside pipe diameter will be the same as on the main line but will have a wall thickness of $\frac{3}{8}$-in.

On navigable and hazardous streams multiple submerged line crossings will be used, in which the crossing on the 24-in. section of the main line will consist of three 16x$\frac{3}{8}$-in. pipe lines and on the 20-in. section of the



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Pentalarm is a pure synthetic chemical manufactured for the sole purpose of odorizing natural gas. This fact makes it possible for you to obtain all of the characteristics most desirable in an odorant.

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One 55-gallon drum conditions 400,000,000 cubic feet of natural gas.

Detailed facts and figures will be forwarded promptly on request.

PENTALARM YOUR PIPELINES!
RECORD IT WITH THE COLORIMETER!

ARMY E NAVY

SHARPLES CHEMICALS INC.

PHILADELPHIA CHICAGO NEW YORK

SHARPLES TRADE MARK CHEMICALS

main line will consist of two 16x3/8-in. pipelines connected on both sides of the river by valves into the headers.

On hazardous streams which lend themselves to aerial suspension crossings the pipe will be suspended across the river by the use of cables.

The Mississippi River will be crossed by hanging two 18-in. lines with aluminum alloy structural forms on the highway bridge near Greenville, Miss.

Highway and Railroad Crossings: Approximately 274 highways and 62 railroads will be crossed by the pipe line system. The system design contemplates the boring of all hard surfaced highways and railroads, and casing the line with 28-in. O. D. steel pipe. The 28-in. O. D. casing will be closed at each end with a dresser coupling and it will be vented as required by the various states and railroad authorities. All county highways and side roads will be ditched where permissible and such crossings will be cased and vented whenever required.

Employee Housing: A total of 27 houses will be built at the compressor stations and the dehydration plant. There will be four houses at Compressor Stations Nos. 2, 4, 8, 10, 12 and 14, and two houses at Compressor Station No. 6, and one house at the dehydration plant. These houses are necessary due to the fact that some employees are on 24-hour call and to the remote location of the plants, which makes it impossible to house all of the employees in near-by towns.

Communications Systems The communication system will consist of a single talking circuit leased from the American Telephone and Telegraph Co. There will be a PBX termination at the main office and a standard telephone termination at each of the compressor stations, the northern Division headquarters at Bowling Green, The Chicago Corp. office at Corpus Christi, the dehydration plant, each of the three delivery stations and at the toll bridge office of the Greenville, Mississippi River bridge.

There will also be local telephone service at each of the compressor stations, the main office and the Dehydration Plant.

Specifications of Pipe Steel: The 24-in. O. D. National Seamless Line Pipe, 9/32-in. wall thickness, theoretical weight 71.25 lbs. per ft., is to be manufactured in accordance with A.P.I. line pipe specifications, 5-L Grade B pipe except as follows.

Minimum physical properties:
- Yield point ..... 45,000#
- Tensile strength ..... 70,000#
- Hydrostatic test ..... 72% of yield point 950 psi)
- Random length average....40 ft. or longer

Chemical limitations:
- Carbon ..... not over .30%
- Manganese ..... .35 — 1.50%
- Sulphus ..... not over .06%
- Phosphorus ..... not over .045%

The 20-in. O. D. National Seamless Line Pipe, 9/32-in. wall thickness, theoretical weight 59.23 lbs. per ft., is to be manufactured in accordance with A.P.I. line pipe specifications, 5-L Grade B pipe except as follows:

Minimum physical properties:
- Yield point ..... 45,000#
- Tensile strength ..... 70,000#
- Hydrostatic test ..... (72% of yield point) 1140 psi
- Random length average....40 ft. or longer

Chemical limitations:
- Carbon ..... not over .30%
- Manganese ..... .35 — 1.50%
- Sulphur ..... not over .06%
- Phosphorus ..... not over .045%

The specifications for the 24-in. O. D. A. O. Smith electrically welded pipe, 1/4-in. wall thickness, theoretical weight 63.413 lbs. per ft.

Minimum physical properties:
- Yield point ..... 50,000#
- Tensile strength ..... 70,000#
- Hydrostatic test ..... (72% of yield point) 940 psi
- Random length average....40 ft. or longer

Chemical limitations:
- Carbon ..... 30% maximum
- Manganese ..... 95 — 1.25%
- Phosphorus ..... not over .045%
- Sulphur ..... not over .050%

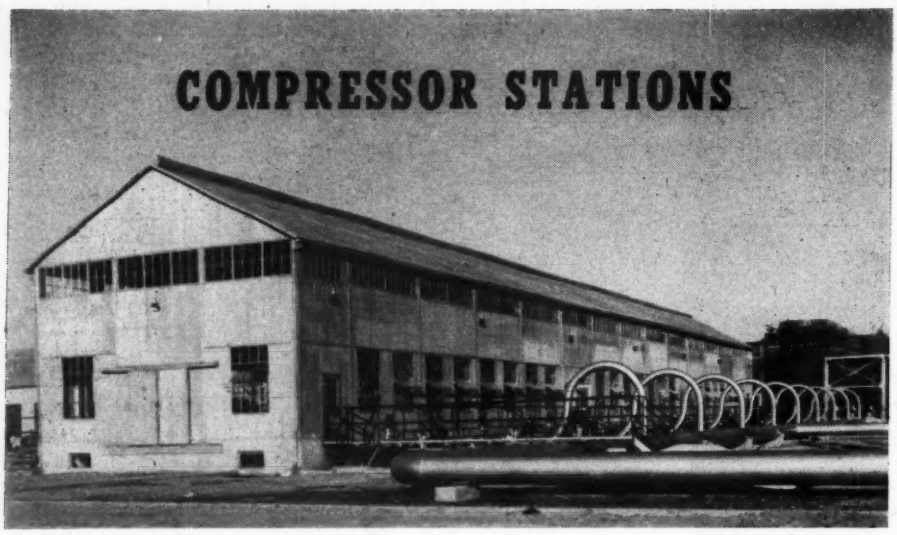
The steel from which the pipe is made shall conform to the following minimum requirements as to tensile properties:

- Tensile strength ..... 70,000#
- Yield point ..... 41,250#

Each length of pipe shall be hydraulically expanded within dies to produce the nominal outside diameter of the pipe. The pressure required produces a hoop stress in the circumferential direction not less than the 50,000 lbs. psi minimum specified yield point in the finished pipe.

ABOVE
Williams Bros. pipe bending machine.

BELOW
Ditcher at work on portion of line constructed by Williams Bros.



IN THE initial design there are seven compressor stations with 58,000 horsepower installed, and in the ultimate design there will be 14 stations with 118,000 hp. installed.

Compressor Stations: The stations in the initial design are spaced approximately 170 miles apart and in the ultimate design they are to be spaced approximately 85 miles apart. There are variations from these distances due to accessibility, as well as availability, of locations for the stations and the reduction in volume of gas transported due to fuel gas used at the stations. Gas used as fuel in the compressor stations is estimated on the basis of 12 cu. ft. per horsepower hour operated.

Under the initial design the compressor units will operate at a compression ratio of approximately 1.83 with an average intake pressure of 416 psi absolute and with an average discharge pressure of 765 psi absolute. Under the ultimate design the units will operate at a compression ratio of approximately 1.54 with an average intake pressure of approximately 500 psi absolute and an average pressure of 765 psi absolute.

Nine 1000-hp. Model LTG-8 Worthington vertical gas compressors are to be installed in Stations 2, 4 and 6. Eight 1000-hp. Model GMV-80 Cooper Bessemer gas compressors are to be installed at Stations 8, 10 and 12, and at Station 14 seven of the Cooper-Bessemer units are being installed.

Compressor Ignition: Engine ignition is the direct-current-impulse type with individual induction coils for each spark-plug. Engines of one manufacture are provided with one distributor handling 10 cylinders. The other engines have dual ignition systems for 8 cylinders. Instead of the conventional magneto source of power to the ignition coils, there is provided an individual direct current rectifier of the copper oxide type for each engine. These units are supplied from a 440 volt, 3-phase, 60-cycle source, having their own built-in transformers, and provide a practically ripple-less 10-14 volt, 2 to 4 amp. direct current which will supply the ignition demands of all engines. Each unit has its own volt and ampere meter, built-in circuit breaker, and rheostat for varying the voltage as required. No batteries are in the ignition circuit.

This system of ignition was developed for the first time for this project and has been thoroughly tested under actual operating conditions by the engine manufacturers. It provides an exceptionally clean and trouble-free source of direct current.

One distinct advantage of this system is that it provides a fool-proof inter-lock between the station electric generators, water circulating pumps and engines. If the electric power fails for any reason, the water circulating pumps on the jacket water system being electric-driven, necessarily shut down. Since the compressor ignition system will also shut down upon a power failure, the compressors are stopped at once, making it impossible for them to become overheated by running after failure of the jacket water circulation.

Another advantage lies in the fact that each machine has its own individual rectifier unit and is, thus, independent of all the other machines. Thus the entire station cannot be shut down through failure of an element of the ignition supply, which is always a possibility where a central battery-and-charger system is used.

Finally, the system is actually cheaper to install and much cheaper to maintain than either the individual magnetos or a central battery-and-charger.

A typical flow of gas through a compressor station is as follows: the inlet gas to the station is passed through a battery of dust scrubbers for removal of dust or foreign particles in the incoming gas.

Dust Scrubbers: Three of these scrubbers are installed in all stations at present. At ultimate gas flow all stations, except No. 14, will require four. No. 14, on account of the subtraction of fuel gas, requires only three. These inlet scrubbers are 54 in. in diameter and have a net shell length of 20 ft. 0 in. Each vessel is designed according to the API ASME Code for

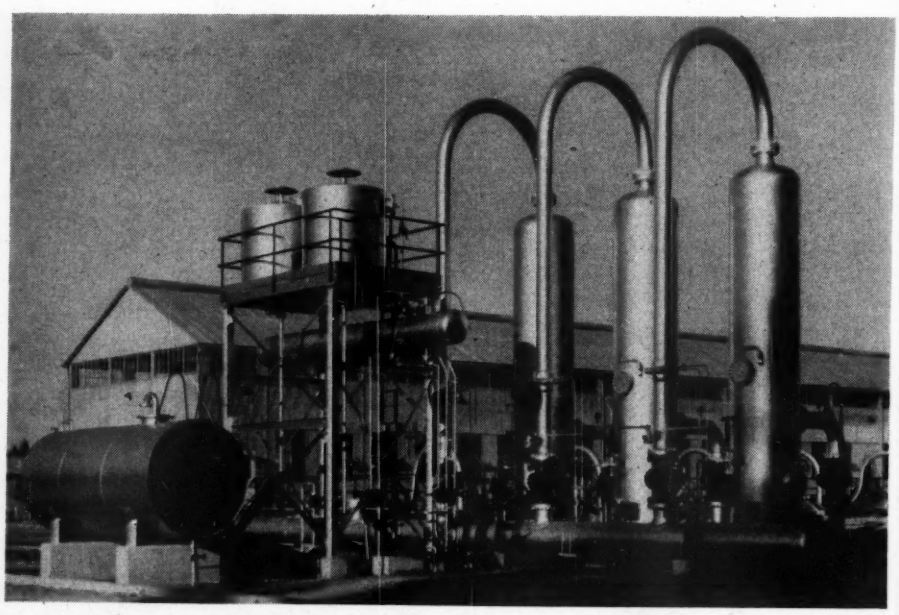


FIG. 1. Dust scrubbers.

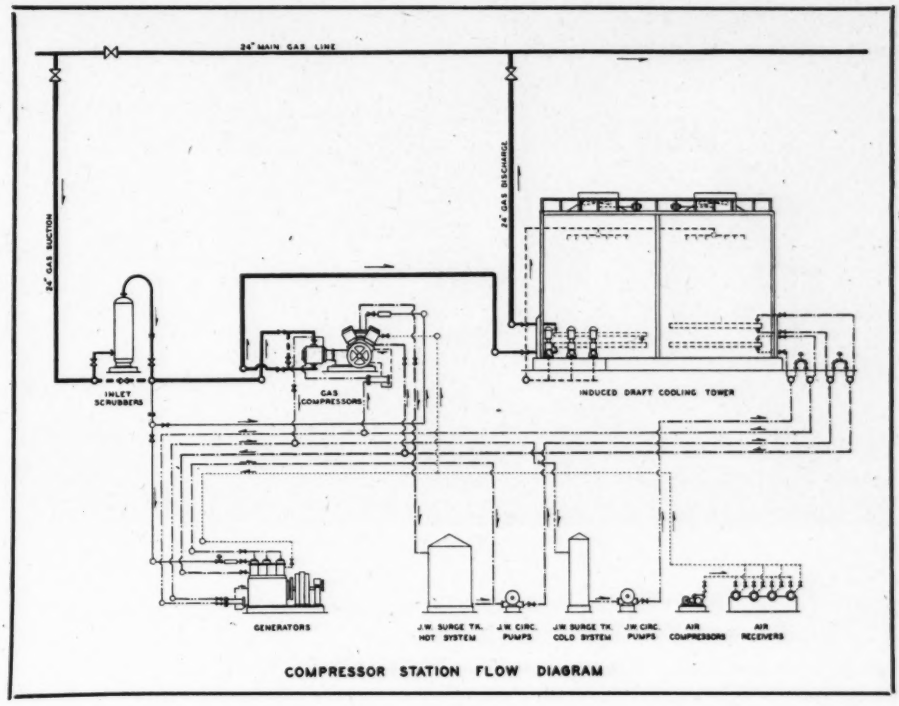
pressure of 786 lbs. psig, at a temperature of 100°F. (Fig. 1).

Each scrubber is designed to have a capacity of 75,000,000 cu. ft. per 24 hours of gas. There is a 12 in. bypass around these units to permit taking one unit off the line for cleaning.

The scrubber oil settling tanks and scrubber oil charging tank are mounted on a steel framework. The dirty oil blown from the base of the scrubbers enters directly into either one of two 5x5 ft. tanks, where the dirt is allowed to settle from the oil. The oil, after the dirt has settled, is drawn off through a swing suction line to the scrubber oil charging tank. A 3-in. line with shut-off valve is provided from the bottom of each tank. This is designed to drain the accumulated dirt and settlings to be placed into suitable containers for disposal, road surfacing, etc.

The vents, hatchways, etc. in these scrubber oil settling tanks are made completely weatherproof. This was necessary to prevent moisture from entering into the oil, carrying over to contaminate the dehydrated gas.

For filling the charging tank, a 14 G.P.M. herringbone gear type pump, with built-in safety valve, is provided This pump is so manifolded that it takes suction from the lower half of either of the scrubber oil settling tanks and discharges into the filling tank.



COMPRESSOR STATION FLOW DIAGRAM

The gas leaving each scrubber passes through a vertical section of 12-in. pipe that serves as a meter run. This run is connected to a recording flowmeter. There is no temperature recorder installed at these runs, as they are not check meters, but are installed only to permit evenly dividing the gas load to the scrubbers. An industrial thermometer in each run indicates temperature. These meters, however, may be used to give an approximate check on the amount of gas flowing into the station.

From the compressors the gas flows to the cooling tower and from the cooling tower into the main line, thence on to the next station. Each compressor station is designed as a complete self-maintaining unit equipped with all nceessary auxiliary equipment, a machine shop for maintenance and a warehouse for spare parts and equipment.

DESIGN DATA CHART—COMPRESSOR STATIONS*

Initial Design

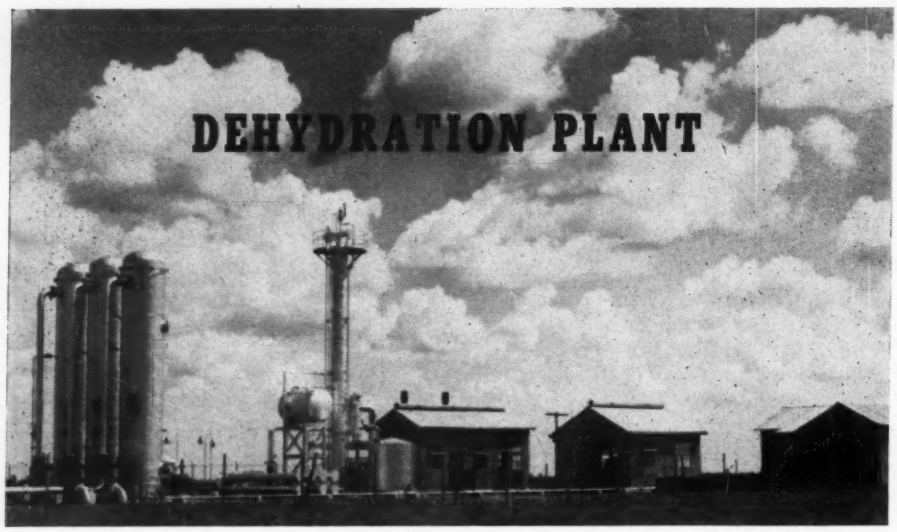
Station Number	*Horsepower Required*	*No. of Units*	*Installed Horsepower*	*Fuel Req. MCF/Day*	*Op. Cap. MCF/Day*	*Mi. Sta. to Sta.*	*Pressure Suction*	*Absolute Discharge†*	*Comp. Ratio*
2	8,801	9	9,000	2,592	221,688	162.57	410	760	1.86
4	8,696	9	9,000	2,592	219,096	157.40	416	759	1.86
6	8,592	9	9,000	2,592	216,504	160.10	416	772	1.86
8	8,676	8	8,000	2,304	211,608	166.70	409	772	1.89
10	7,685	8	8,000	2,304	213,912	173,81	438	772	1.76
12	8,234	8	8,000	2304	209,304	178.63	416	769	1.85
14	7,042	7	7,000	2,016	207,000	180.70	416	761	1.83
Total	57,726	58	58,000	16,704	204,984	1179.91			

Ultimate Design

1	8,918	9	9,000	2,592	293,680	78.08	496	772	1.56
2	9,249	9	9,000	2,592	291,088	84.49	473	772	1.63
3	8,301	9	9,000	2,592	288,496	80.00	499	772	1.55
4	7,633	9	9,000	2,592	285,902	77.40	515	772	1.50
5	7,563	8	8,000	2,304	283,312	79.22	513	772	1.50
6	7,688	9	9,000	2,592	281,008	80.88	512	772	1.51
7	8,105	8	8,000	2,304	278,416	86.84	494	772	1.56
8	7,934	9	9,000	2,592	276,112	86.97	499	772	1.55
9	7,267	8	8,000	2,304	273,520	83.40	518	772	1.49
10	7,082	8	8,000	2,304	271,216	83.30	523	772	1.48
11	7,818	8	8,000	2,304	268,912	92.33	496	772	1.56
12	6,953	8	8,000	2,304	266,608	86.30	522	772	1.48
13	7,037	8	8,000	2,304	264,304	90.40	513	772	1.50
14	7,905	8	8,000	2,304	262,000	90.30	519	893	1.72
Total	109,454	118	118,000	33,984	259,696	1179.91			

*Station locations are as follows: No. 2, East Bernard, Tex.; No. 4, Jasper, Tex.; No. 6, West Monroe, La.; No. 8, Ratesville, Miss.; No. 10, Lobelville, Tenn.; No. 12, Campbellsville, Ky.; No. 14, Burnaugh, Ky.

†Discharge pressure increased 7 lbs. for pressure drop in station, in calculaing Hp required. Pressure base—14.73 psi absolute. Delivery pressure—475 psi gauge.



THIS ARTICLE on the Dehydration Plant and the article on the Compressor Stations are based on information furnished by Tennessee Gas and Transmission Co., and from an article, "Tennessee Gas and Transmission Co. Compressor Stations and Dehydration Plant," by HAROLD F. DAWE, gas engineer, The Stearns-Rogers Manufacturing Co., Denver and HENRY N. WADE, Parkhill and Wade, Los Angeles, Calif.

THE dehydration plant will be constructed at the origin of the main line in Nueces County, Texas, at which point the feeder system ties into the main line.

Dehydration Plant: This plant is designed to operate at a pressure of 840 psi gauge and with an initial capacity of 225,000 Mcf per day and for an ultimate capacity of 300,000 Mcf per day by the installation of additional facilities. Fig. 3 shows a flow diagram of the plant. The flow sheet for the dehydration plant is given in Fig. 2.

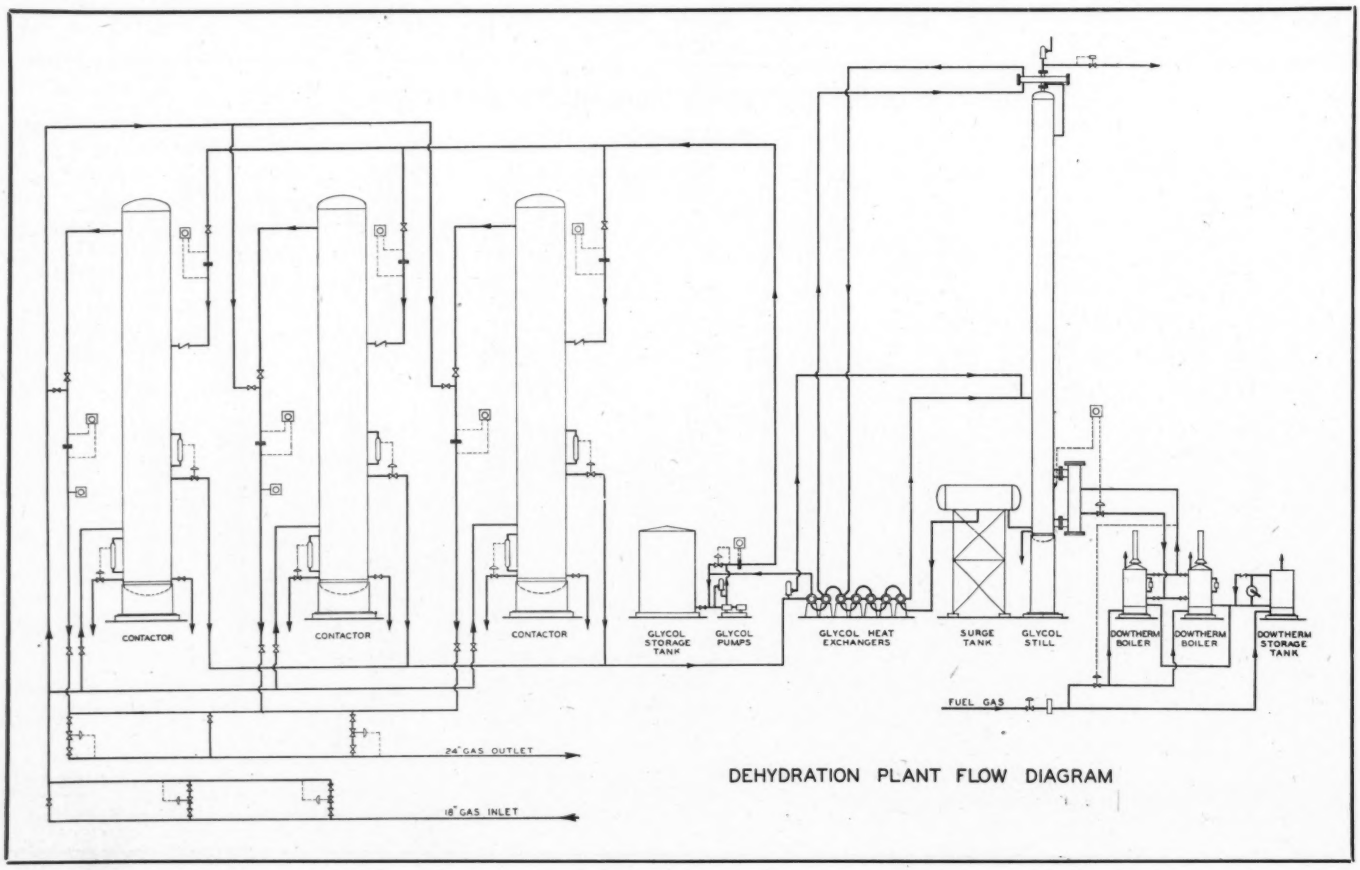
The gas enters the dehydration plant through an 18-in. pipeline reduced from 900 to 840 lbs. through 8-in. pressure reducing regulators, in duplicate. Each regulator is designed to handle 225,000,000 cu. ft. per 24 hours, with a 35 lb. pressure drop. A bypass cuts out one, or both, of the regulators

The gas from the regulators enters an 18-in. header and flows into a battery of three contactors in parallel, where the gas is intimately contacted with concentrated diethylene glycol, which, being hygroscopic, absorbs moisture present in the natural gas, and, thus, depresses the dew-point.

The contactors are 78-in. in diameter and have a net shell length of 31 ft. 6 in. The units each contain two scrubber sections and four contact trays. The contactors are of API-ASME code design, fully stress relieved and x-rayed.

The gas, on leaving the three contactors, flows through 12-in. pipe and through a 12-in. meter run. There is a recording flowmeter on each run and a recording thermometer installed on two of the three runs. The recording thermometers are so arranged that one unit covers two runs for check purposes.

The gas leaving the meter runs is conducted through a header to a duplicate regulator setting where the pressure is reduced from 825 lbs. psig to 750 lbs. psig through either or both of two 8-in. pressure reducing regulators in parallel. Each regulator is designed to handle 300,000,000 cu. ft. of gas per 24 hours at 75 lbs. psig pressure drop. A bypass and block



DEHYDRATION PLANT FLOW DIAGRAM

THANKS

The job is finished. We deeply appreciate the fine cooperation of all who participated in this wartime project.

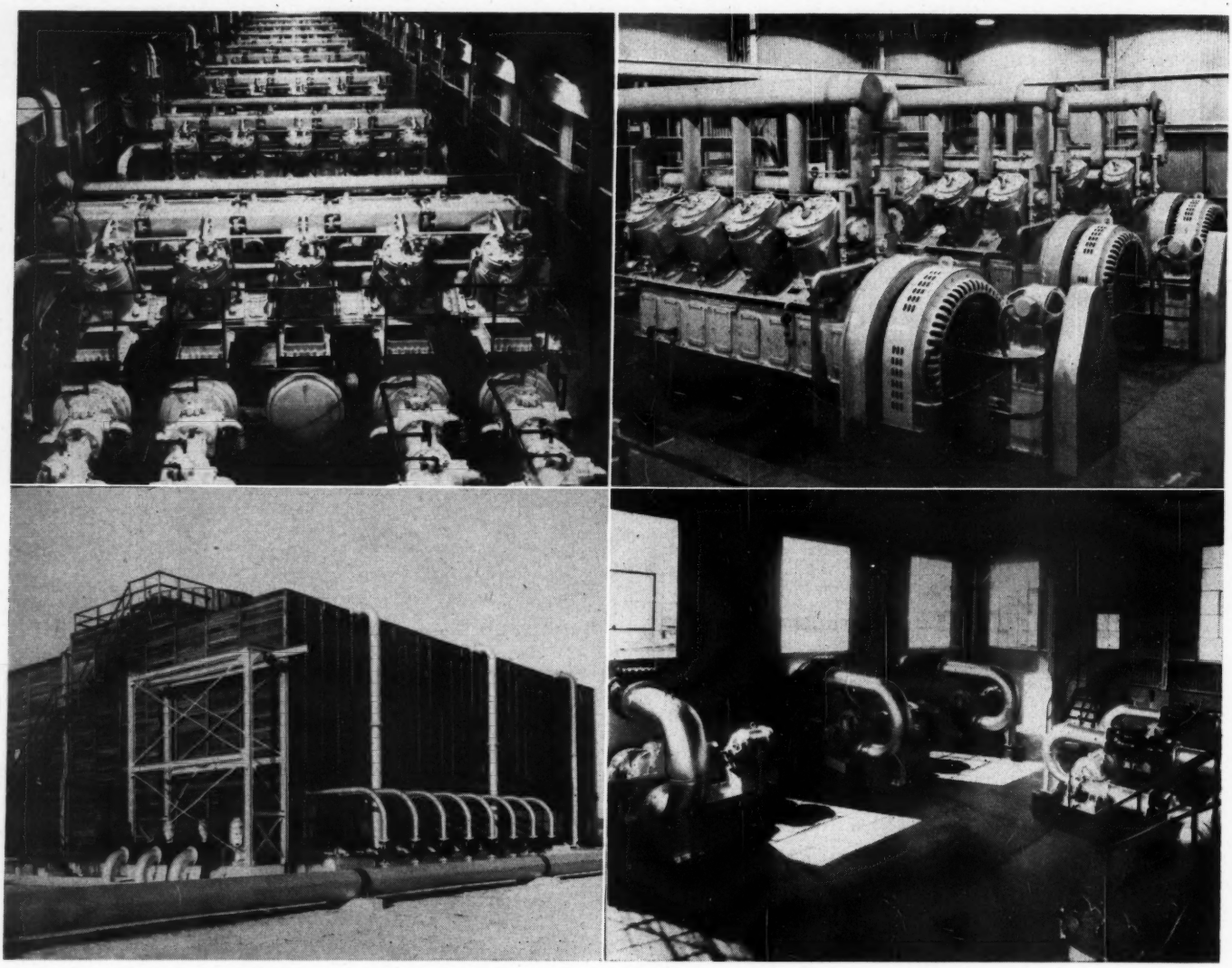
★ ★

TENNESSEE

GAS AND TRANSMISSION COMPANY

HOUSTON, TEXAS

★ ★ ★ ★



Interior views of Compressor Station No. 8 at Batesville, Miss. Above left, the engines; at right, generators; below, left cooling tower; at right, pumps for jacket water, hot and cold circuit.

valves cut out one or both regulators. The gas from these regulators constitutes the supply source of gas for the 24-in. pipeline.

Th diethylene glycol from the contactors, slightly diluted with water, is drained from the contactors into a return line by a liquid level control mounted on the contactor. The glycol then flows to the heat exchange system, of seven shell and tube heat exchange units in series, where it flows through the tubes and is heated by the reconcentrated glycol from the still.

Between the second and third exchanger units in the series, the glycol is passed through a reflux condenser mounted on the top of the gylcol still. This condenser serves to condense water reflux for the still from the water vapor, and further heats the glycol. This reflux condenser may be partially bypassed by a vernier hand control valve, as required. The glycol then returns to the third exchanger unit and flows through the remaining units, extracting additional heat from the lean glycol until it finally enters the glycol still feed tray.

The glycol still is 30-in. in diameter and has a net shell length of 32 ft. 6 in., with a 10 ft. 0 in. skirt The vessel has 15 bubble trays. The vessel is designed for a working pressure of 50 lbs. psig, and is equipped with a safety ladder leading to the platform and condenser support at the top.

A chordal weir baffle in the still serves to keep the glycol reboiler flooded over the level of the tubes, maintaining heating at maximum efficiency. The reboiler is of the vertical type and connects to the still by 12-in. top and bottom nozzles. It is 24-in. in diameter and has a net shell length of 6 ft. 10-in. The shell thickness is ¼ in. There are 454-¾-in.-16 ga. tubes—48 in. long installed between two tube sheets presenting an internal transfer surface of approximately 300 sq. ft. The reboiler is designed for 50 lbs. psig working pressure at a temperature of 550° F.

The lean glycol flowing from the base of the still enters a 60-in. diameter surge tank having a net shell length of 8 ft. 0 in. This vessel is mounted horizontally to make the maximum use of the tank surge space. This vessel serves to maintain an even head on the lean glycol through the heat exchangers, and to the suction of the glycol pump. It also acts as reservoir, or surge space, for the entire solution circulating system.

The lean glycol, after passing through the heat exchangers, is pumped back over the contactors. The pump used for this service is a 3¾x5-in. union triplex plunger type, driven by a 40-hp., 440 volt, 60 cycle, open

frame electric motor, with a complete spare unit.

This pump forces the lean glycol through a 3-in. discharge line to the contactors. The lean glycol flows through a flow recorder controller which records the exact total flow of glycol to the contactors. Also, on low glycol flow or failure, the controller operates an alarm whistle which warns the operator. From this point, the glycol flow is split over each contactor by means of an indicating flow meter with manual throttle valve.

For heating the glycol, there are installed two No. 33-3A Dowtherm vapor generators. Each of these generators has a capacity of 1,000,000 Btu per hour, and is capable of maintaining the total plant heating load for a short period. However, the plant design anticipates the use of both generators in parallel under normal conditions.

These generators are equipped with safety valves, low level warning controls, and with pressure controls. A low level control is connected to sound a warning signal on low liquid level. The pressure control switch cuts off the gas to the main burners when the desired pressure is reached, but leaves the pilots burning. Upon complete gas failure, the pilot valves close, which are normally energized by an electric current generated through the heat of the pilot. The source of energy for the electric controls is a 6-volt heavy duty storage battery. This energy has been chosen as most reliable and is independent of power failure to the plant.

To control the base temperature of the still, there is installed a recording temperature controller with thermo bulb in the still base. The controller operates a throttling type diaphragm valve in the Dowtherm return line to the boiler. Where the reboiler must supply more heat to the still base, the valve opens and allows a greater flow of Dowtherm through the reboiler, the valve partially closing upon lower heat requirements, and thus flooding part of the reboiler surface with liquid.

The type of plant designed and installed is that using a diethylene glycol cycle. The dewpoint of the gas passing through this plant will be reduced 40° to 50° below the temperature of the incoming gas.

All gas entering the pipe line system is to be dehydrated to prevent the formation of hydrates in the system and to minimize internal corrosion and to eliminate restricted flow due to water accumulation.

A tractor operator and two Pressure Weld operators comprise a crew.

PRESSURE WELDING

By E. L. Forbes, Jr., vice president and general manager, Pressure Weld Company.

THE longest section of pipe line ever welded by the Pressure Weld method has recently been completed for the Tennessee Gas and Transmission Co. It was likewise the largest diameter pipe ever welded by this process. The 320 mile Texas section of the Tennessee job was laid by four spreads. Each spread included a trained Pressure Weld crew, using a patented Pressure Weld Clamp. Many new problems arising from the size of pipe welded and the type of terrain traversed were encountered and successfully solved. The experience gained in Pressure Welding 24-in. pipe in swamps, rice fields and wooded country has been added to that which the Pressure Weld Co. has previously won in welding lines from 2 in. to 16 in. in desert, mountain and prairie country.

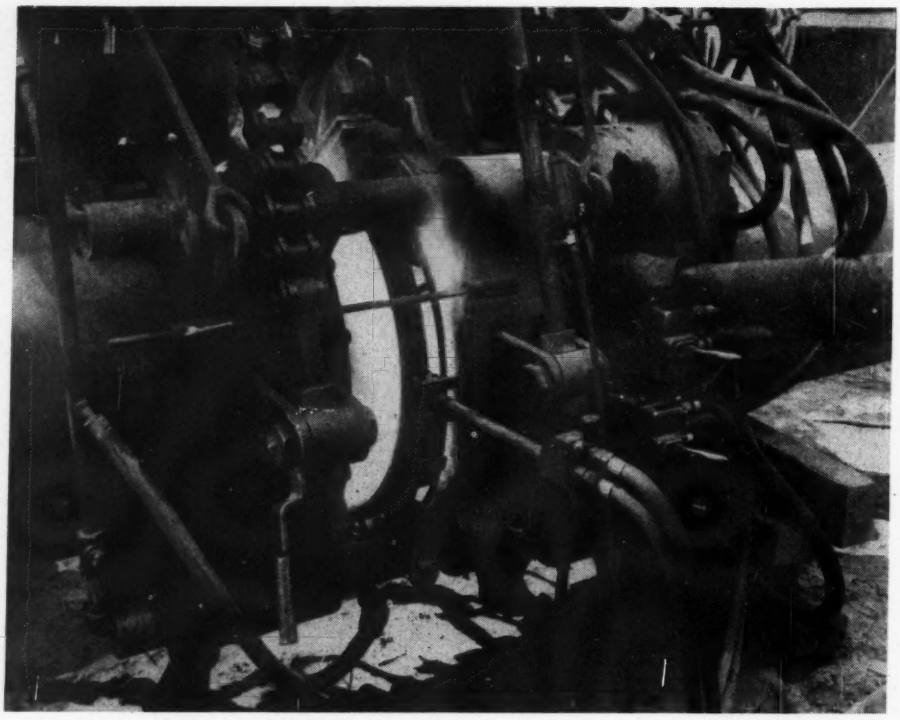
Owing to the speed required in completing the Tennessee line, welding went on for 18 hours a day on two spreads. The tractor carrying the clamp was equipped with lights and partial darkness was found to be no hindrance to the speed or quality of the welding due to the semi-automatic nature of the operation of the Pressure Weld Clamp.

Oxy-acetylene Pressure Welding is a new, patented, mechanical welding process that differs from fusion welding in that the parts to be joined are not heated to the fusion temperature but are forced together under a controlled application of heat and pressure.

The "24" Pressure Weld Clamps used on this job are the largest ever built. (See Fig. 1). They employ a principle that, in itself, is not new, but its adaptation to pipe line construction is a recent development. These clamps serve several purposes. They lock and hold the pipe in place for welding, they round up the two joints to be welded, and they perform the actual welding operation. A compactly built unit that is easily transported along the ditch bank suspended from a side boom mounted on a tractor, the Pressure Weld Clamp is constructed like two concave halves of a clam shell, which closes around the joints of the pipe.

The clamp is equipped with a brass, water-cooled, circular torch extending completely around the pipe. The torch has No. 70 orifices spaced approximately ¼-in. apart, and when lighted by means of a oxy-acetylene mixture, produces an even heat over the entire circumference of the two ends of the joints to be welded. Integral parts of the clamp are hydraulic units which pull the two pipe ends together, after they have been heated by the torch to exactly the right temperature, causing the two joints to be upset one into the other. The resulting bond is caused by diffusion and recrystalization at a temperature below the melting point of the metals being joined.

Also carried right along with clamp, on a trailer pulled by the side boom



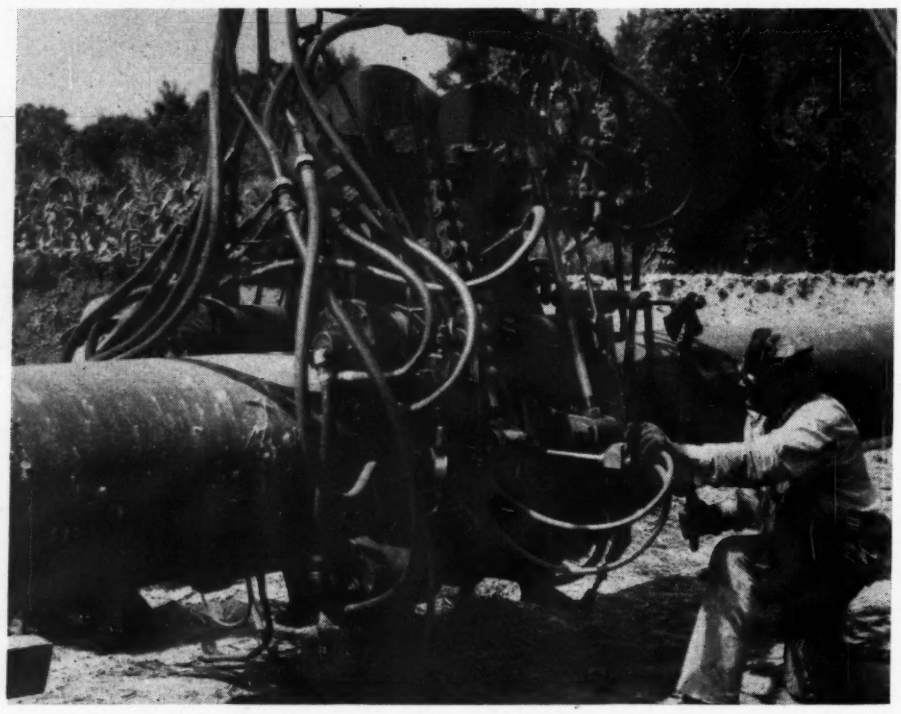


FIG. 1. Showing application of "24" Pressure Weld clamps, the largest ever built, on Tennessee Gas and Transmission Co. Line.

tractor, is an acetylene generator together with oxygen cylinders. The hydraulic equipment is handled from the tractor by a tractor operator. The Pressure Welding crew is comprised of the tractor operator and two Pressure Weld operators.

An interesting new tool (Fig. 2) developed and patented for use on the Tennessee job was the electrically driven pipe-end preparation machine. It was mounted on a specially designed jig which fitted inside the pipe. The use of this new tool saved a great deal of time in cleaning and preparing the ends of the pipe for welding. It also made a better joint than the older methods.

The Pressure Welding Method again proved on the Tennessee job what had previously been discovered on shorter lines and smaller sizes of pipe; namely, that it can increase the speed with which lines can be welded, that it can considerably decrease the number of men required to do the work and lastly, that it can very substantially cut the cost of pipe line welding. As an example of the speed with which this work can be done, one mile of 24-in. line on the William Brother spread was welded in 7 hours. 156 welds were averaged per working day on the entire 117 miles laid by this spread.

There are several advantages to the Pressure Welding method, one of the most important of which is the fact that the time required to make Pressure Welds does not lengthen as the diameter of the pipe increases nor are additional men or equipment required. Among other advantages found in the Pressure Welding method are the facts that these welds are essentially stress and distortion free, and composition is unchanged at the point of welding.

This process has now been successfully used for over three years on various types of pipe lines, including oil, natural gas, water, steam and helium. Sizes of pipe lines Pressure Welded include 2⅜, 4½, 6⅝, 8⅝, 10¾, 12¾, 16 and 24 in. Lines carrying pressures in excess of 2000 psi have been successfully Pressure Welded.

Since the start of the Tennessee job, more than a dozen new Pressure Weld Clamp operators have been trained. These men, together with the company's old-timers, will enable a wider use of this new method of welding pipe lines.

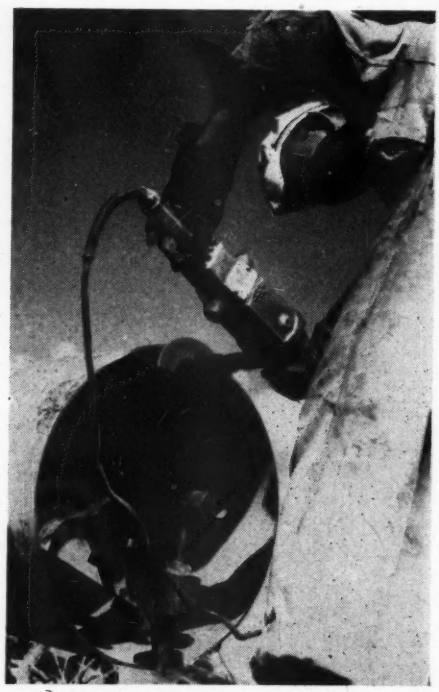


FIG. 2. Electrically driven pipe-end preparation machine, developed and patented for use on the Tennessee line

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East Ohio's Liquefaction Plant Destroyed

Night view of the burning storage tanks.

GRIM and sudden tragedy struck the East Ohio Gas Co.'s No. 2 plant, the American Gas Association Testing Laboratories, and a 50-block section of eastside Cleveland when the largest of four holders containing liquefied natural gas stored against peak demands gave way on the afternoon of Friday, Oct. 20 .

Latest estimates place the dead at 170, including 70 East Ohio employees, many of the latter key men in the operation of the Cleveland distribution system. Property damage may be as high as $10,000,000.

The wreckage of this cylindrical container which, in its turn, damaged the spherical container next to it released large quantities of liquefied gas which upon exposure to the air re-gassified and ignited from unknown sources. The flames were said to reach a height of 2800 ft. The burning gas was carried by the wind principally eastward destroying practically every building of the Company on its premises. In addition some 200 dwelling houses and buildings in the neighborhood were destroyed or rendered uninhabitable.

Other families were temporarily homeless due to the evacuation of dwellings in the district as a measure of precaution against further spread of the fire. These families have moved back to their homes.

Mrs. Viola Moore, office manager at the Laboratories, who was uninjured, gave the Cleveland *News* the following eye-witness account:

"I was at work in the office. I looked out the window just at the moment the first explosion came. The fire apparently started in one of the large liquid gas storage tanks. I don't know what set it off. I did not see any one around the tank at the time.

"Our building was immediately enveloped in flame. There were seven girls working in the office with me at the time. We all ran to the windows and jumped out. It was about a 12-ft. drop to the ground.

"The whole area was turned into a holocaust before you could snap your finger, it happened so quickly."

R. M. Conner, director of the American Gas Association Laboratories, adjacent to the Gas Company plant, threw new light on the possible origin of the holocaust. He told *News* reporters that he had talked with eight of his employees who were in the Laboratories at the time and they told him that the large cylindrical tank was the first to explode.

"The first explosion was slight. It occurred at the base of the tank and was accompanied by white puffs of vapor. Next, one of the vertical seams seemed to let go. Then there was a large explosion, an immense gush of vapor which immediately turned into great sheets of flame. This all took only about 15 seconds."

Effect on Laboratories

That part of the American Gas Association Testing Laboratories' building nearest the East Ohio plant suffered sereve damage.

First reports were that the explosion had occurred in the A.G.A. Laboratories. These were proved false. The aerial photo shows the Laboratories on the edge of the devastated area with its walls and four holders intact. Leo A. Diamond, counsel for A.G.A., on Oct. 23 advised Managing Director Forward that "There is no question but that we (A.G.A.) are free from liability since the original explosion did not occur on our property. There was no explosion in the Laboratories at any time.

Eight Laboratories employees were hurt in the blast, two of them seriously. Three manufacturers were also hurt: Leslie Vixler, Cleveland Heater Co.; Earl Hillenbrand, Florence Stove Co.; and a representative of the Chattanooga Implement Co. Another casualty was F. G. Maddocks, Titan Valve Co. truck driver, who suffered shock. His truck was burned to the ground. Latest reports indicated that all would recover except one employee and one manufacturer.

The Laboratories building, including test apparatus and records, were partially destroyed by the ensuing fire.

The architects and builders who constructed it originally have made an inspection of the structure for safety and for further utilization, especially the north wall.

The Laboratory has accepted the offer of the American Society of Heating and Ventilating Engineers to use their research laboratories at 10700 Euclid Avenue temporarily.

Description of the Plant

Completed late in 1940 following years of experimentation and study, East Ohio's liquefaction plant, so far as is known, was the only one of its kind in the world. It had been in successful operation for four years. The four containers, three spherical, each with a capacity of 50 MM cf., and one cylindrical, with a 90 MM cf. capacity, held the equivalent of 240 MM cf. of natural gas.

Designed to augment the company's peak load capacity, the plant was cap-

TELEGRAM

I am unfamiliar as yet with details of Cleveland explosion. I am confident, however, executive board of American Gas Association will take necessary steps to assure continued usefulness of Laboratories to industry. I am particularly shocked at death of Charlie Turner who has just completed a year of splendid service to the industry as chairman of technical section and who has the high respect and affection of all those privileged to know him.

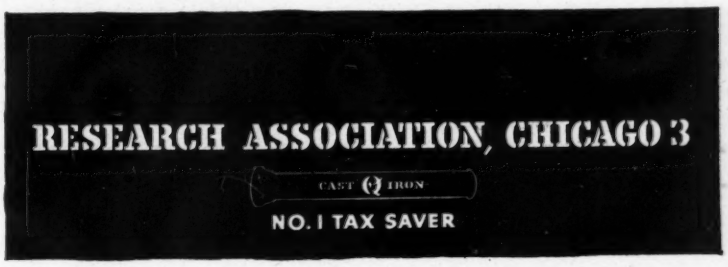
ERNEST R. ACKER,
Retiring President, A.G.A.

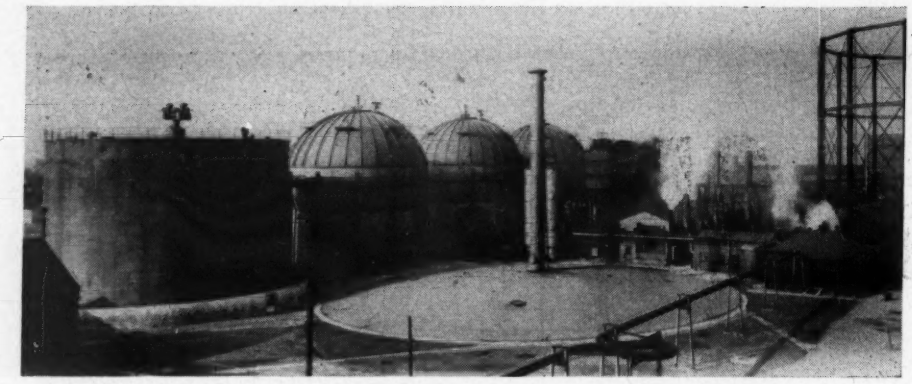
If a shipment of pipe is necessary for the maintenance of your distribution system at something like reasonable efficiency, you can get that pipe *now* if you order cast iron pipe. To meet just such situations, our members are carrying ample stocks of both mechanical joint pipe and bell-and-spigot pipe on their storage yards. In addition, the Office of War Utilities of the War Production Board, recognizing that gas is indispensable to many war industries, as well as homes, *wants* you to maintain your gas distribution system at requisite efficiency to meet existing demand.

☆ ☆ ☆

Every experienced distribution engineer knows that cast iron pipe is long-lived and economical (the first cast iron gas main laid by the first gas company in America is still in service). He also knows that cast iron pipe is available with mechanical joints, tested by the A.G.A. Laboratory, and proved in the field to be bottle-tight under high pressures. And he also knows that mechanical joint cast iron pipe can be quickly and easily installed without skilled labor.

For further information, address Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3.





View of liquefied storage facilities of the East Ohio Gas Co. taken prior to the accident. At the left is the 90,000 cu. ft. cylindrical holder which failed. To the right of this are seen the three spherical holders, cooling tower, the compressor building, while at the extreme right is a holder which went through the fire unscathed. In the foreground, center, is the well of an old holder into which surplus liquid gas was drained to be evaporated harmlessly into the atmosphere through the vent.

land distribution system, consisting of some nine buildings, in addition to the liquefaction plant was located.

Comparisons With Other Types of Storage

According to reports and from observation of the aerial photograph it will be noted that the large water seal holder which was partially filled with gas and quite close to the destroyed tanks, was uninjured. Comparison of the Cleveland plant with usual gas storage methods brings out the following defferences:

1. Great difference in fuel concentration.

2. If the liquid gas is released, accidentally or otherwise, being heavier

ON-THE-SPOT REPORTS FROM REPRESENTATIVES OF GAS MAGAZINE

Two representatives of GAS happened to be in Cleveland at the time of the disaster: Jay Jenkins, publisher and L. V. Hohl, eastern manager. Their reports follow.

Mr. Jenkins: Some 10 square blocks are completely void of all types of utility service. Other parts of the city have resumed normal service. The radio is used constantly to advise people, and inform them of the progress being made as to turn-ons, etc.

Of the four holders at the main plant, two are completely destroyed. The entire gas plant is gone, and nearly all of the A.G.A. Laboratories building. Every automobile parked in the area went with the explosion.

F. R. Wright, of the Laboratories, said he felt a rumble, like an earthquake. He looked out of the window in time to see one of the holders split open, with fire shooting up amidst clouds of gas and smoke. By the time he and others in the building had reached exits, both front and back entrances of the Laboratories were ablaze, and any remaining employees had to be evacuated by window at the south end of the building.

When the employees at the Laboratories tried to leave, the entire north and west sides were in total flames, 100 ft. high, and they had to escape via south side windows.

P. M. Conner has announced that the re-building of the Laboratories will start as soon as it is practical.

Mr. Hohl: I just got back from a trip out to what's left of the gas plant. I talked the police out of a pass and walked all over the place. It's all covered with mud and rock wool, with which the tanks were insulated to a thickness of 3 ft.

From the aerial photo, it can be seen that the roof of the Laboratories building is intact, as are the four holders in the rear. I went through the building today and there is a lot in it that hasn't been touched. The window frames are burned out of most of the north section nearest the gas plant, but in some of the rooms nothing seemed disturbed. In one room there were about two dozen white shiny gas ranges, apparently untouched. The sluffing room was undamaged, and damage in the south section, away from the plant, did not seem great. One inside office had papers on the desks and nothing seemed disturbed.

On the subject of the origin of the fire, nobody seems to have an opinion that is worth much. However, it is obvious that it couldn't have started in the Laboratories. In the first place, it is on the edge of the devastated area and the wind was blowing from the north, which is from the direction of the holders of the gas company. The houses immediately to the south and the west were not too badly burned.

A. F. Carver, chief engineer, Cleveland Heater Co., who was in the laboratory at the time, said we could quote him as saying that there was no explosion in the laboratory at any time and it was impossible for the fire to have started there.

There were a lot of freak things about the fire. It seems that immediately after the first explosion, a curtain of fire about 15 ft. above the ground swept over the area in a matter of seconds. People escaping were burned on the head and back by the intense heat and not by flames. I saw one man whose head was badly burned but his hair wasn't even singed. It was a radiated heat coming from the flames above.

able of liquefying 4,000,000 cu. ft. of natural gas per 24 hours; the regasifying rate was 3,000,000 cut. ft. per hour. The containers were heavily insulated, and the gas was stored at a temperature of —267° F. and a pressure of 3 lbs. psi above atmosphere.

Originally the storage provided consisted of the three spheres. These were built by the Gas Machinery Co. of Cleveland. The cylindrical holder, which according to reports failed, was completed in May of 1943. According to press reports this holder developed leaks immediately after its construction. Repairs were made, however, and after subsequent tests the holder was judged to be satisfactory.

The plant site covers 14 acres upon which the operating plant of the Cleve-

Ruins of maintenance and office building.

This air-view photograph of the area devastated shows: 1. A large water sealed holder partially filled with gas. Despite its proximity to the destroyed tanks, it was uninjured. 2. The two spherical holders which withstood the blast. 3. Destroyed spherical holder. 4. Remains of the vertical holder which gave way releasing liquid gas. 5. The totally demolished gas company offices. 6. Automobiles of gas company employees which were a total loss. 7. American Gas Association Testing Laboratories which were badly damaged by fire. 8. Holders behind the Laboratories which were apparently undamaged.

than air in the liquid phase, it will flow along the ground like gasoline for considerable distances and thus may encounter an open flame or other source of ignition, when the explosive vapor-air mixture above the liquid will instantly flash. In contrast, if gas is released from holders used in common practice, being lighter than air it will rise immediately and rapidly and thus is unlikely to become ignited.

3. The storage of natural gas in liquid form involves extremely low temperatures, —257° F. in the Cleveland plant. At this extreme temperature all ordinary structural materials become very brittle and susceptible to shock. Plain carbon steel usually employed for pressure vessels intended to operate at normal temperatures, becomes as brittle as glass at a temperature considerably above —250° F. Nickel steel, which was employed in the pressure shells of the Cleveland tanks, has a higher impact resistance than carbon steel, but it is by no means immune to this universal embrittling effect of temperatures below 0° F.

While, pending a detailed investigation and report, it would be sheer conjecture to attribute the Cleveland disaster to this characteristic, nevertheless it presents a difficult engineering problem which is not encountered at all in the design of ordinary gas storage holders.

Seven Investigations

At the present time seven separate investigations are under way. These are being conducted by the FBI, Army and Navy intelligence, the coroner, police, and fire officials, and The East Ohio Gas Co. Even as the fire roared on, an ordinance covering the storage of liquefied gas under pressure was presented to the Cleveland city council. It provides:

> "In no event shall any such tank be located nearer than 2000 ft. of any inhabited dwelling nor within 1500 ft. of any public highway or within a like distance of the main track of any railroad, place of public gathering or store."

The disaster brough a shut-down of gas service in 6200 homes, stores, and factories. Two war plants were put out of business while 39 others were without gas and power.

Gas seepage from broken lines and mains continued throughout the day following the accident, holding up orders for restoration of gas service, which was shut-off as a precautionary measure in a 2-mile square area radiating from the fire scene.

With one of its principal standby facilities obliterated, Cleveland faces a gas supply problem this winter. The completion of the Tennessee Gas and Transmission Co. line (see page 15) this month, however, will likely mitigate the severity of the situation.

ENGINEERING AND ECONOMIC PHASES

(A Report of the A. G. A. Postwar Planning Subcommittee)

THE several studies and investigations to be undertaken by the Subcommittee on Engineering and Economic Phases, A. G. A. Postwar Planning Committee have not all been completed. However, some of the studies have progressed to a point where certain inescapable conclusions are evident. These are as follows:

Economics of Heating

No. 1 The heating load for many of the companies is the key to future load building.

No. 2. Some few companies can, through the expenditure of relatively small sums of money to correct bottlenecks in plants and distribution systems, take on and supply economically substantial additional volumes of heating loads.

No. 3. Other companies whose present plant facilities are being used to capacity—will need to exercise considerable ability and ingenuity to be able to expand plant facilities to serve additional heating loads economically.

No. 4. Except for certain areas the use of propane or butane for peak loads does not appear to offer a solution to the serving of the heating load on an economical basis. Certain studies and investigations which are under way may change these conclusions.

No. 5. Based on available data the distribution investment to serve the heating load of present customers is the relatively minor investment of the total.

No. 6. The production plant equipment is the most serious part of the investment cost to serve the heating load.

No. 7. The production plant equipment investment costs are made up of the following approximate percentages:

1. Generating equipment (Sets, blowers, blast headers, etc.) 20 to 30%.
2. Boilers including steam accumulators, 20 to 30%.
3. Cleaning gas—condensors, purifiers, Cottrells, etc., 15 to 20%.
4. Miscellaneous items—meters, exhausters, pumps, piping, buildings, land, 20 to 40%.

No. 8. To substantially lower production investment costs will require a gas process which will minimize the need for items 2, 3. 4 (of No. 7) as well as Item No. 1. In other words, to find some way to merely increase capacities of generators effects a reduction in only one of several items which comprise only 25% of the total investment.

No. 9. The industry needs and must have a low investment cost plant to meet peak loads of heating.

Economics of Sales

From the economics of sales manufactured gas report we can draw the following conclusions:

No. 10. The evidence (of results prior to the war) shows that gas can be sold in substantial volumes for domestic and other purposes in spite of the competition from other fuels.

No. 11. The gains made in Mcf. gross and net operating revenues (for the six years prior to the war) *vary widely* as between companies.

No. 12. The differences in results *do not appear to be due to local competitive* conditions, since companies similarly situated show a wide difference in the gains made.

No. 13. The major reason for the widespread *difference* in performance seems to be due to *local company policies.*

Appliance Survey

No. 14. The gas appliances available prior to the war, were, in general, adequate to met competitive appliance performance.

No. 15. There seems a need for improving and strengthening certain parts of gas appliances so as to reduce servicing costs. This applies to both domestic and commercial appliances, the latter particularly needs drastic improvement from a servicing viewpoint.

No. 16. There is a real need for a fully automatic safe lighting pilot. This lighting equipment should *never require the use of a match.*

PUBLISHED HEREWITH are excerpts from the report of the A.G.A. Postwar Planning Committee's subcommittee on the "Engineering and Economic Phases of the Industry," which is functioning under Chairman Hall M. Henry, director of gas operations, NEGEA Service Corp., Cambridge, Mass. Mr. Henry's study is a portion of the report that the A.G.A. Postwar Planning Committee had prepared for presentation at the A.G.A. meeting in Chicago prior to its cancellation.

Research

No. 17. There is need for a Director or Coordinator of Research.

No. 18. The industry needs to undertake immediately an aggressive gas production research program. The future of the manufactured gas division of our industry may well hinge on our ability to secure a low investment cost gas production plant. The economic position of certain natural gas companies could be improved if a low investment cost gas plant could be developed.

No. 19. The industry also needs a distribution research program — on ways and means for lowering the distribution investment cost to serve fringe customers particularly — and the distribution investment costs to serve heating loads may well receive attention.

No. 20. The industry needs to continue and enlarge its utilization research program. Especial attention should be given to the development of fully automatic lighting pilots. (No match ever required). We should no longer allow our crude competitor to boast of the ability to use his equipment *without ever having to use a match,* when most all of our equipment requires the use of a match to light a pilot.

No. 21. The industry should undertake to make a periodic (yearly or when new major developments occur) determination of the relative operating costs between gas and competitive fuels under normal conditions of service and use for the following:

a. Cooking—using gas vs. coal, oil, electricity and bottled gas.

b. Water heating—when obtained under the following conditions:

1. Tank heater—gas vs. electricity and oil.
2. Automatically controlled storage water heater—gas vs. electricity and oil.
3. Instantaneous—gas vs. electricity, oil and bucket a day coal.
4. Central heating plant—gas vs. coal and oil.
5. Kitchen stove—gas vs. coal and oil.

c. Refrigeration—gas vs. electricity, oil, bottled gas and ice.

d. Heating—gas vs. oil and coal.

The above findings and recommendations, while not official in every respect, are fully justified from the Engineering and Economic studies thus far completed.

Development of the Gas Industry Through
RESEARCH AND PROMOTION

By ERNEST R. ACKER

President, American Gas Association

THE gas industry is about to embark on one of the most momentous undertakings in its history. It has recognized the need for aggressive action to improve the economics of its business and to meet the competition of other fuels in the postwar period, and will shortly launch a campaign to raise an additional amount of $1,000,000 per year for three years to finance an expanded program of research, national advertising and general promotional effort.

This program is a direct result of the able and constructive work of the Postwar Planning Committee of the Association, and is designed to carry out those recommendations of the Committee which require the combined action of the entire industry rather than individual company action. The reports of the Committee are based on sound analyses of markets, the means of securing such markets, and the engineering and economic factors affecting the present and future operations of the industry.

Earnings Unimpressive

Aside from the abnormal record of the war period, the trend of earning of a large section of the gas industry in recent years has been unimpressive, to say the least. Rising costs of labor and materials and the rapid advances of competing services have had a marked effect upon the ability of the industry to maintain and develop its business, and it is clearly indicated that this situation will be accentuated in the period after the war.

The fact is that the economic advantage which the gas industry has heretofore enjoyed over other modern fuel services has shown a downward trend for some years past. It is probable that this trend will be accelerated during the postwar period, particularly with respect to electric competition, unless the gas industry is prepared to meet the challenge of electric capacity released from war production requirements and seeking an outlet in the domestic field.

The aggressive advertising and promotional efforts of the electric industry which have far outweighed those of the gas industry and will be intensified after the war, have already had a material effect upon customer preference and the relative position of gas vs. electricity as the modern fuel. The record of the past decade shows that the average domestic electric "use," has increased approximately 70%, whereas domestic gas "use," including space heating, in the manufactured gas industry shows no gain, and in the natural gas industry only about 14%.

Current information indicates that the electric industry's postwar planners contemplate an increase of 50% in their domestic business by 1950, and it should be evident that this can only be accomplished by inroads on the gas industry. I realize that the figures of past growth are not entirely comparable as between the two industries but I submit that they nevertheless indicate clearly the reason for the narrowing differential between the competitive costs of gas and electric services.

The position of the gas industry in the financial world is a direct reflection of its mixed record since the last war. The negative attitude of financial interests, particularly with respect to manufactured gas company securities, is clearly illustrated in Moody's Bond Survey of August 21, 1944, which comments at some length on the past record and future prospects of that section of the industry. Moody's judgment as to "Investments in the Manufactured Gas Industry" is expressed as follows:

> "Long term prospects for the manufactured gas industry, in our opinion, are unimpressive, and generally speaking we recommend against commitments in bonds of companies thus engaged. Immediately, and for some further time, there is no cause for concern but a conservative policy is suggested because (1) there is the likelihood of gradual further deterioration over a period, (2) purchases must be made at high prices in the present market and (3) funds can be placed to better advantage at only small concessions in yield in more strongly situated obligations of other utility enterprises, notably the bonds of electric operating companies, the outlook for which is for further improvement in their underlying security in the postwar era."

This is a matter of grave concern to the manufactured gas industry, particularly in its effect on the thinking of large investors throughout the country who have already in numerous instances required a higher yield from gas company securities than from those of other utilities. The Moody article further indicates that the 15-year record is unimpressive, stressing loss of earning power during the depression period 1930-1934 and stability rather than gains between 1935 and 1940.

The position of the gas industry is no different from that in which other major industries have found themselves as a result of economic change or too great reliance on price advantage. In every instance the solution has lain in improvement of the product and aggressive promotion of the business. These things have been

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"THE FUTURE OF THE GAS INDUSTRY is in its own hands. What that future may be depends to a large extent upon the initiative, intelligence and effort which the industry exerts in its own behalf. Rising costs and aggressive competition have created problems which require immediate and effective action. The industry must unite in a determined effort to improve the economics of its operations and to promote its business so that the possibilities of gas service may be realized to the fullest extent and the position of the gas industry may be strengthened as an important factor in our social and industrial structure. Such action on the part of the industry will not only preserve and extend its markets but will have a direct bearing on the ability of the industry to attract new capital on more favorable terms in the future than have prevailed in the recent past.

"It is obvious that financial interests are attracted by the securities of those industries which show a progressive spirit and which continually safeguard their future through substantial expenditures for research and aggressive promotional effort. It is essential, therefore, that the gas industry in its own self-interest demonstrate its faith in the future of its business by appropriating adequate funds for research and promotional development."—From the text of the "Plan for Research and Promotional Development in the Gas Industry."

President Acker's address was presented before the Annual Meeting of the American Gas Association, October 5, 1944.

A PLAN FOR RESEARCH AND PROMOTIONAL DEVELOPMENT IN THE GAS INDUSTRY

The plan calls for additional funds of $1,000,000 per year for a three-year period, beginning October 1, 1944, to provide for an expanded program of research, national advertising and publicity and general promotional effort. Such funds would be in addition to those provided by the industry for the support of present industry activities and would be used and administered as indicated in the tabular summary of the Plan:

For Research, $600,000

Utilization Research in connection with domestic, industrial and commercial appliances $200,000

General Technical Research including research on gas production transmission and distribution. (It is proposed that of this amount $350,000 be assigned to gas production research, of which $270,000 will be provided by manufactured gas companies and $80,000 by natural gas companies.) $400,000

Appropriations for all research purposes during the past fiscal year of the A.G.A. amounted to $189,000 and could be financed from the general funds of the Association only because of the curtailment of other activities of the Association as a result of the war.

For National Advertising, $200,000

To provide for the use of better media, four-color advertisements, an increased number of insertions, advertising surveys and increased publicity on gas service and appliances. The amount allocated is in addition to the amount of approximately $400,000 per year now being contributed by the industry to the National Advertising Program and will be supplemented by proposed contributions from gas appliance manufacturers of at least $200,000 per year, making a total program of $800,000 per year. The additional amount provided under this Plan will be available for increased domestic, industrial and commercial gas service and appliance advertising $200,000

For General Sales Promotion and Coordination, $200,000

Promotional Bureau, $100,000

It is proposed to organize at A.G.A. Headquarters a Promotional Bureau staffed with highly qualified personnel to augment and coordinate the promotional work of the Association with gas utility companies, gas appliance manufacturers and manufacturers of related appliances and equipment, and to act in an advisory capacity to the Sections and Committees of the Association in the development of aggressive, coordinated promotional plans for advertising publicity and sales programs. Estimated cost for calaries, traveling and miscellaneous expenses..... $100,000

Sales Promotional Programs, $100,000

Development and execution of industry-wide sales promotional programs coordinated with those of gas utility companies, gas appliance manufacturers and manufacturers of related appliance and equipment. Among the programs proposed are the promotion of Certified Performance Appliances, the Coordinated Kitchen, training of sales personnel, market research and surveys, and the general acceptance and distribution of gas appliances. $100,000

TOTAL ADDITIONAL FUNDS REQUIRED ANNUALLY FOR THREE-YEAR PERIOD..... $1,000,000

accomplished in numerous instances through increased expenditures for research, effective advertising and intelligent promotional effort based on a thorough knowledge of what the public wants and will buy. Organized efforts along these lines, greatly exceeding those which the gas industry has financed in the past, are essential to the future of the industry.

It is proposed that the required additional amount of $1,000,000 per year for the three-year period beginning October 1, 1944, be provided by voluntary subscription to the fund at the rate of .15 of 1% of the gross revenue of natural gas utility companies and at the rate of .32 of 1% of the gross revenue of manufactured gas companies, and at the of 1/30 of 1% of the gross revenue of natural gas pipe line companies. A ceiling of $80,000 will apply to the annual contribution of any single operating copany. Mixed gas companies, whose production operations include reforming of natural gas only, are regarded as natural gas companies; other mixed gas companies as manufactured gas companies.

Based on the revenues of natural, manufactured and mixed gas companies for 1941, the last prewar year, the proposed subscription rates will provide a fund of 1,400,000 per year if companies representing 70% of the total gas meters in the country participate in the program.

Companies now subscribing directly to the National Advertising Program which totals approximately $400,000 per year will be entitled to credit the amount of such annual subscriptions against their annual subscriptions to the new Research and Promotional fund.

Subscriptions in each of the three years will be based on revenue for the previous calendar year and on commitments for the full three-year period.

The funds provided under this Plan will be earmarked for the purposes stated and will be allocated to specific projects by the Special Committee authorized by the Executive Board.

Responsibility for the expenditure of funds so allocated will rest with the Department, Bureau, Section or Committee to which the activity is assigned, under the general supervision of the Executive Board.

This, in brief, is the Plan prepared by the Committee on Gas Industry Promotional Development and approved by the Executive Board of the Association for submission to the gas industry. The details of the Plan represent the combined opinion of a large numher of industry executives as to what is best for the industry as a whole irrespective of the interests of individual companies or groups.

Special Committee Named

The Executive Board in approving the Plan, authorized the appointment of a Special Committee of not more than 12 gas industry executives to raise and administer the funds to be provided under the Plan. Such Committee, which is now in process of formation, will shortly submit the Plan to all members of the industry and will arrange through regional committee activity for personal solicitation and follow-up of each individual company.

The Plan provides a gross fund of $1,400,000 per year for a three-year period but a net additional fund of $1,000,000 per year after credits have been taken for $400,000 now being contributed to the National Advertising Program. This $1,000,000 is allocated, $600,000 for research and $400,000 for promotional activities. There are those in the industry who feel strongly that the research funds alone should be raised to $1,000,000 per year, while others feel equally strongly that that amount and more should be expended for additional promotional effort. The Committee in the end struck a balance which it felt would gain the majority support of the industry and which resulted in a total amount which the industry could be reasonably expected to contribute at the present time.

The $600,000 for research provides $200,000 for utilization research on domestic, industrial and commercial appliances, and $400,000 for technical research. The utilization research has gained wide support as a result of the excellent work already done at the A.G.A. Laboratories and because of the fact that specific research projects can be readily defined and scheduled in this field.

The $400,000 for technical research includes $50,000 for distribution and transmission projects, which can also be readily outlined in advance, and $350,000 for gas production research which is practically a new field of association activity. This element of the program represents the thinking of manufactured gas company representatives who feel that the industry cannot hope to develop or even hold its business unless it can find the means to produce low cost on-peak gas for house heating in the immediate future and can utimately develop an over-all low cost production process in substitution for existing production methods.

The need for such developments is recognized by the entire industry. There is some lack of agreement, however as to when and how such research should be undertaken, the argument being advanced that the industry should not be asked to supply funds for production research until a specific program of projects has been developed indicating more clearly how the money is to be spent. Equally strong argument has been presented to the effect that production research cannot be specifically defined or limited in advance, and that the needs of the industry are so compelling that sufficient funds should be made available to initiate and carry through a substantial program of research in the whole field of gas production. This issue was debated at length by the Committee responsible for the preparation of the Plan, the Committee finally taking the position that the objectives of the proposed research are clear, that there are developments already under way which merit immediate additional research expenditures and that the industry can properly depend upon highly competent technical committees to give assurance that the research funds proposed to be collected now for future use will be constructively and wisely spent.

It is obvious that the funds for production research will not be expended at the rate of $350,000 per year for a three-year period. It is intended that they be collected on this basis to create a total fund of $1,050,000 which will be available for use over whatever period is necessary for the completion of a sound and effective program. It is entirely possible that additional funds will be required as the program is advanced but the Committee feels that such funds will be readily obtainable on the basis of the potential value of such new developments as result from the research undertaken. The initial funds cannot be specifically justified on an individual project basis but must be made available by the industry with faith in its own future and with the full expectation that adequate research expenditures will ultimately produce the results desired.

The promotional features of the Plan involve estimated expenditures of $400,000 per year for the three-year period, $200,000 for additional National Advertising and $200,000 for qualified promotional personnel and for sales promotional programs.

The Postwar Planning Committee states that the industry can now unite aggressively in support of the "clean, cool, odorless kitchen," which will excel in cooking, as well as in cleanliness and cost, that provided by all other fuels. The gas industry will have something worthy of its best promotional efforts in the postwar period and must now prepare for a fight to the finish for the all important domestic load.

The volume of National Advertising of the electric industry is so far beyond even the capabilities of the gas industry that there can be no thought of attempting to compete on a volume basis. The gas industry, however, must have a program of sufficient size and effectiveness to justify its existence on its own merits and to supplement the programs of the gas appliance manufacturers.

Present contributions to the National Advertising Program total approximately $400,000 annually. With these limited funds the National Advertising Committee has done an excellent job but it is now estimated that a fully effective program involving four-color advertisements, the use of better media and an increased number of insertions, would cost a minimum of $800,000 per year. It is proposed that of the additional $400,000 per year required, $200,000 per year be provided by gas utility companies through the operation of this Plan and that $200,000 be provided by gas appliance manufacturers as their contribution toward the success of an enlarged National Advertising Program. It is difficult to conceive of a more modest approach to a vital problem than that represented by this $800,000 program of National Advertising financed by the entire gas industry.

The enlarged promotional activities proposed under the Plan involve the establishment of a Promotional Bureau at A.G.A. Headquarters, staffed with highly qualified personnel, to initiate, propose to or prepare for Sections and Committees, promotional plans for advertising, publicity and sales programs; to enlarge and coordinate the promotional work of the Association with all branches of the industry and of related industries; to foster and guide new product development; and to promote market research and surveys. In addition, the Plan provides additional funds for sales promotional efforts in the postwar period including resumption of the CP range program; the development of similar promotional programs for gas water heating and househeating equipment; the promotion of the "Coordinated Gas Kitchen Program" already initiated by authority of the Executive Board; the development of salesmen's selection and training programs and the promotion of the general acceptance and distribution of gas appliances.

Complete details on the "Plan" are covered in the presentation which I commend for your careful consideration.

SPECIAL COMMITTEE ON GAS INDUSTRY RESEARCH AND PROMOTIONAL PLAN

N. B. Bertolette, Hartford, Conn.
P. S. Young, Newark, N. J.
C. E. Bennett, Pittsburgh, Pa.
Bruno Rahn, Milwaukee, Wis.
H. K. Wrench, Minneapolis, Minn.
J. V. Bowes, Tulsa, Okla.
F. S. Wade, Los Angeles, Calif.
Paul B. McKee, Portland, Ore.
W. Bond Collins, Miami Beach, Fla.
C. H. Zachry, Dallas, Tex.
F. T. Parks, Denver, Colo.
E. R. Acker, Poughkeepsie, N. Y., chairman.

The president, and the chairmen of the Natural Gas and Manufactured Gas Departments of the Association will serve as ex-officio members of the Committee.

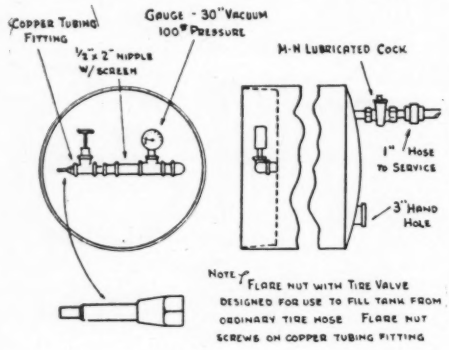
A second Committee representing the best promotional talent in the industry will, with the assistance of the Chairmen of the interested Departments, Sections and Committees of the Association, have supervision over the operation of the Promotional Bureau provided under the Plan and of the promotional programs approved from time to time by the Special Committee of executives listed above.

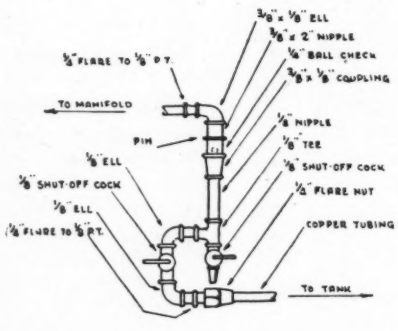
OPERATING IDEAS

Cleaning Gas Services With Vacuum by Truck Motor

A steel tank of about 2 cu. ft. capacity, with valve and compound gage (30 in. vacuum, 100 lb. pressure), both protected by screen, is strapped in position on the truck. A lubricated cock and 6 ft. of suction hose are installed at the air inlet.

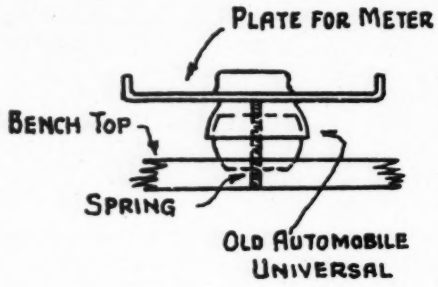
The manifold of the truck is tapped for ⅛ in. pipe and ¼ in. copper tubing is run to the dashboard where the valve assembly is located. Copper tubing is then run from this assembly to the rear of the cap where the connection to the tank is made with small rubber hose or ¼ in. copper tubing.


COPPER TUBING FITTING
GAUGE - 30" VACUUM 100# PRESSURE
⅛" x 2" NIPPLE W/ SCREEN
M-H LUBRICATED COCK
1" HOSE TO SERVICE
3" HAND HOLE
NOTE: FLARE NUT WITH TIRE VALVE DESIGNED FOR USE TO FILL TANK FROM ORDINARY TIRE HOSE. FLARE NUT SCREWS ON COPPER TUBING FITTING



Operation: A vacuum is created in the tank. When the tank is connected to the manifold, it will be necessary to open the air intake valve on the dashboard for a short time so as not to stall the motor. The specially designed air valve also permits the tank to be used with pressure.

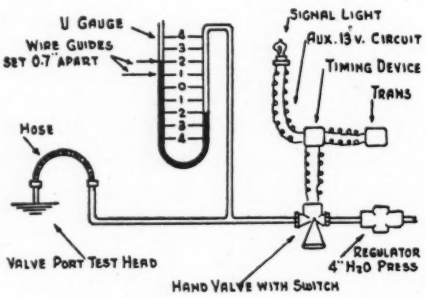
Cleaning: Close valve at gage, disconnect tubing and take tank to meter location. Remove meter and attach hose to the inlet sides of meter bar or directly to the service pipe. Open the lubricated cock very slowly until the sound of dust or rust starting to move can be heard, then quickly turn the cock wide open.



Swivel Plate for Topping 5-Lt and 10-Lt. Meters

When topping, it is necessary to tilt the meter at different angles and place a block under the bottom each time the meter is moved. A swivel plate is made of an old universal joint from an automobile. Once the meter is placed on the plate it can be tilted and turned in any position desired without putting the soldering copper down.

The plate is made of flat iron ⅛ in. x 10 in. x 12½ in. with angle iron sides. The ball joint is fastened to the bench and the collar is fastened to the plate. These are held together by a coil spring.



Meter Diaphragm Tester

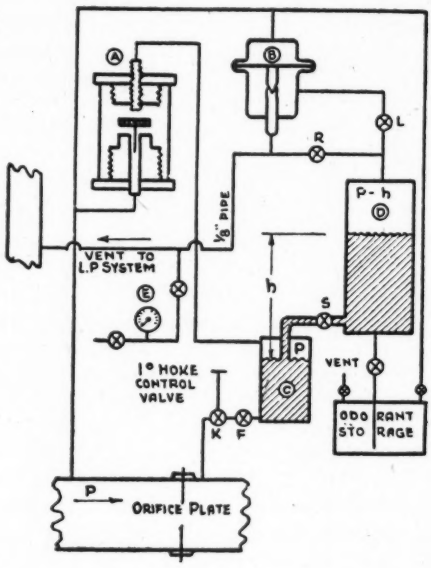
Minute holes in meter diaphragms do not cause meter inaccuracies at the low pressure differentials of operation. This device will determine whether or not a diaphragm has a "proof affecting" leak. After the diaphragm is filled with air, the hand valve is closed thereby closing an electric circuit to the timing device. After 7 sec. the timer closes an auxiliary circuit turning on small light. If during this 7 sec. the static pressure inside the diaphragm has not dropped below 26 in. (as noted by lower wire guide) the diaphragm is considered to be O.K. This limit mark must be set to maintain sound repair practice.

From AGA's "Report of Subcommittee on Wrinkles," W. R. FRASER, Michigan Consolidated Gas Co., Detroit, Chairman.

Drip Odorizer for Natural Gas

The sketch illustrates a drip-type odorizer in which several old principles are utilized in new combinations.

Odorant is added to gas in amounts proportionate to the flow by differential pressure across an orifice being



transferred through the small constant level feed tank (C). Flow is controlled by a 1° needle-type valve. Odorant is stored in the calibrated measuring tank (D), and is fed to the small cylinder (C) automatically as required, a constant level being maintained by the old "Chicken Watering" principle.

The system is safeguarded against abrupt pressure changes in either direction by the use of the check valve (A) and special relief valve (B). The latter valve remains in the closed position during normal operation and opens if line pressure drops. If the line pressure drops, the odorant in the measuring tank would be forced into the system by the pressure of the gas above the liquid. When the normal pressure conditions are resumed, the measuring tank is repressured by gas flowing through the check valve and bubbling up through the liquid. Indicating pressure on gage (E) shows failure of relief valve (B).

CORROSION AND PROTECTION

Of Buried Metallic Structures

Compiled and Abstracted by GUY CORFIELD, Technical Editor, GAS

4. Cathodic Protection, Theory and Research

Determination of Current Requirements

KIRK H. LOGAN, chief, underground corrosion section, National Bureau of Standards with the collaboration of Drs. J. M. PEARSON and I. A. DENISON and Messrs. R. F. HADLEY and A. V. SMITH. Excerpts from a paper, "The Determination of the Current Required for Cathodic Protection," presented before U. S. Bureau of Standards Soil Corrosion Conference.

IT IS generally agreed and can be shown by the consideration of electrochemical processes that electrolytic corrosion of steel will cease when current flows to all points on the surface of the steel. The difficulty in determining whether this condition has been established with respect to a buried metal lies in the facts that neither the buried metal nor the soil adjacent to it is an equi-potential surface. As a result, measurements of the difference of potential between the metal and the earth taken to determine the direction of the current in the earth with respect to the surface of the metal represent the average of several potential differences which may differ in magnitude and direction.

Therefore, the cathodic-protection engineer usually tries to apply a potential which will cause at least some current to flow to every point on the metal surface. Since he has no way of determining when he has accomplished this he is forced to apply such potentials as experience has shown to be satisfactory under other conditions assumed to be similar to those under consideration. The simplest of these procedures is to apply current until the pipe is negative to the earth by an amount depending on the kind of electrode used and the judgment of the engineer. Three tenths of a volt is the difference of potential frequently chosen if a steel electrode is used, and 0.85 volt if the reference electrode is copper surrounded by a saturated copper sulfate solution.

The copper-copper sulfate electrode is frequently regarded as preferable because it is nearly constant in its potential and nearly free from polarization if it carries only a very small current.

That the potential of iron with respect to a copper sulfate reference electrode is not the same for all soils is indicated by Table 1. For a test of the effectiveness of zinc as a source of cathodic protection, three iron rings were buried in each of eight locations. The potential of each ring was measured with a potentiometer voltmeter before the experiment was started. The potentials at six of the test sites are shown below:

The potential difference between a pipe and an electrode some distance from its surface may be affected by an IR drop caused by current flowing to or from the pipe. This may be important in cases of cathodic protection. On account of the possible sources of error just mentioned many engineers use the change in potential of the pipe when current is applied as the criterion for the degree of protection and assume that the pipe is protected when its potential has been lowered 0.3 volt. Obviously the condition of the pipe may be such that no current is required for its protection, in which case the lowering of its potential is unnecessary.

Under other conditions the change in potential of the pipe with respect to an electrode some distance away may be due largely to the IR drop in the soil and not representative of the change at the pipe surface. To avoid this error some engineers use an electrode separated from the pipe by about 1/8 in. of insulation. This avoids most of the IR drop unless the pipe has an insulating coating, but such measurements are influenced by the condition of the pipe adjoining the electrode. It is, of course, possible to take account of the resistance of the soil or coating surrounding the pipe as has been done by Ewing [4] and Scott [5 6].

The most important objection to potential or change in potential as a criterion for protection was pointed out by Ewing [7], who showed that when current was applied to a cathode such as a pipe line the potential of the protected metal with respect to a reference electrode might gradually increase or decrease depending on the reaction at the cathode. The reaction is determined by the aeration and pH value of the soil.

Current-potential curves: In the course of a study of the velocity of corrosion Britton [8] found that when the current flowing to a piece of iron in aerated 1/10 N. potassium chloride solution was gradually reduced from a value more than sufficient to prevent corrosion of the iron, the potential of the iron with respect to a reference electrode quite near it increased up to a certain current and then remained constant as the current was further reduced. Experiments as well as theoretical considerations showed that the break in the curve occurred at the current density just sufficient to prevent corrosion. The experiment was repeated with other concentrations of potassium sulfate.

Ewing [7] working at the Bureau of Standards as a Research Associate for the American Gas Association, undertook an extended investigation to determine how the phenomenon discovered by Britton [8] could be used to determine the current required for the protection of pipelines. By the use of the work of Muller [9] he showed that the potential of a corroding cathode was its original potential diminished by the IR drops resulting from the flow of the local and imposed currents, i.e., that if these IR drops

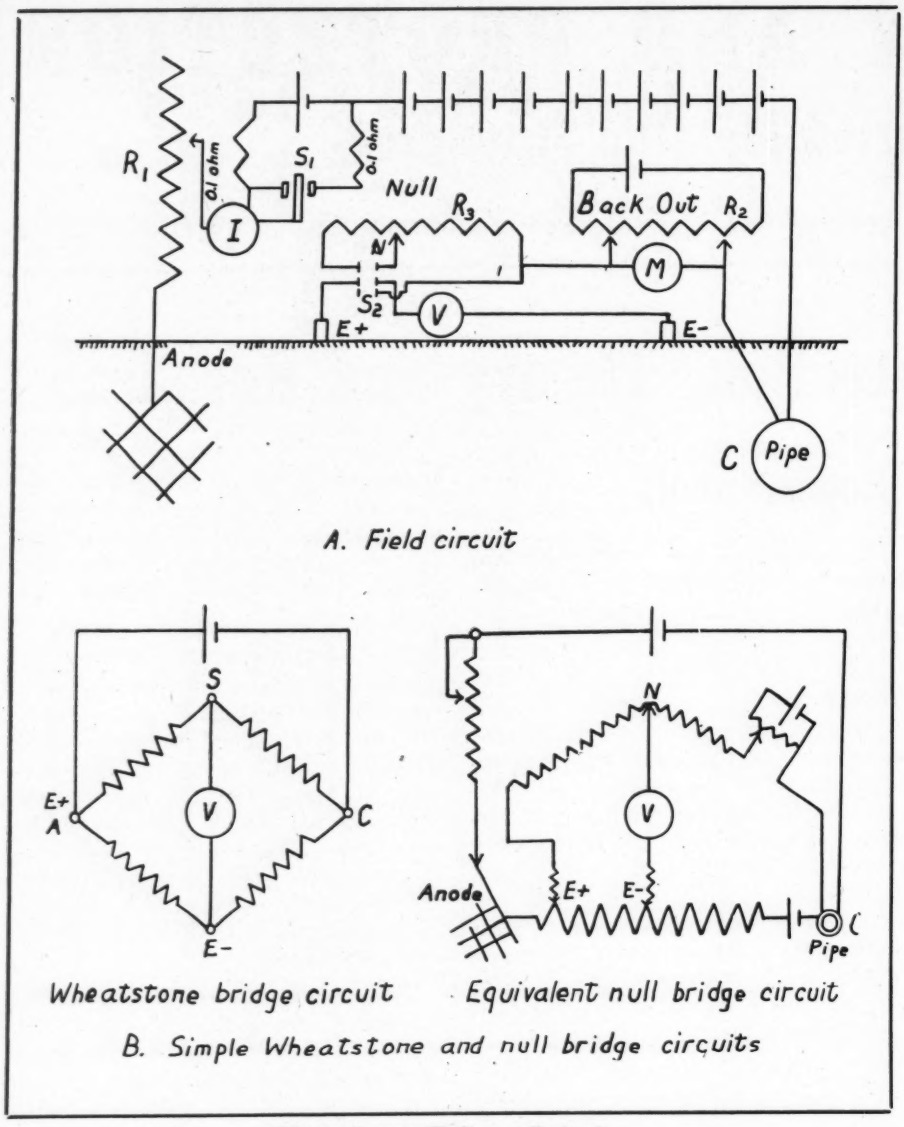


FIG. 1. Pearson-Hadley null circuit.

were deducted or eliminated from the observations the corrected potential of the cathode would be a constant.

Ewing also showed, by reasoning and citations of the work of other experimenters [9,10], that after the current became sufficient to prevent corrosion the cathode would act as a hydrogen electrode and that the potential of such an electrode varies with the logarithm of the current flowing to the cathode. Consequently if the true potential of the cathode is plotted against the logarithm of the impressed current, the resultant curve should consist of a horizontal and a sloping line connected by a curve representing the transition to the overvoltage curve. The intersection of the projection of the straight lines indicates the current required to prevent corrosion.

All methods for determining the conditions required for the protection of a buried structure involve a source of power such as a welding generator, rectifier or battery; a means of varying the power, such as a rheostat; and an ammeter. The sizes of these pieces of apparatus depend on the size and condition of the structure to be protected. Usually considerably more current will be required for a test using Ewing's criterion than for the other methods, although the current required for protection may be less, according to Ewing's criterion. All methods involve the measurement of the potential of the structure with respect to a reference electrode, and because of the high resistance of this electrode or of the earth adjacent to it and because of the possibility of polarization of the electrode, the potential measuring instrument should have a high internal resistance. A potentiometer-voltmeter or a vacuum tube voltmeter is usually used. It is desirable that both the ammeter and the voltmeter have the same period and that this be short.

The null method: Difficulties encountered by Ewing and McRaven in running potential-log current curves by a method which involved measurement of the resistance between the electrode and a pipeline and the computation of the IR drop to be deducted from the observed potential, led the latter to suggest a two-electrode circuit for eliminating the IR drop. This was the forerunner of the null circuit developed by Pearson for laboratory research on electrode phenomena and modified by Hadley for field use. Fig. 1 shows the essential features of the Pearson-Hadley null circuit.

The operation of the circuit is as follows: With the current circuit open and S_2 in the left position, the null circuit is opened and the original potential of the structure obtained as by the earlier method. S_2 is then reversed, the current circuit closed, and the rheostat R adjusted to permit the passage of the estimated protective current or any other current sufficient to cause a well-defined change in the reading of the vacuum-tube voltmeter when S_1 is shifted. The switch S_1 is then moved from side to side, and the sliding contact N on the null potentiometer is adjusted until changing the position of the switch S_1 causes little or no change in the reading of the vacuum-tube voltmeter, which is serving as a null galvanometer. When a change in I does not affect the deflection of the galvanometer the latter is obviously not affected by an IR drop in its circuit.

A comparison of the null circuit in Fig. 1 with the Wheatstone bridge circuits below it in which corresponding points have been similarly let-

TABLE 1.

Location	*Potential of iron ring with respect to CuSO4 electrode Volts*
Austintown, Ohio	—.575 to —.600
Deerfield, Ohio	—.725 to —.730
Rocky Ford, California	—.740
Albuquerque, New Mexico	—. 70 to — .74
Los Angeles, California	— .49 to —. 52
Shreveport, Louisiana	—.753 to —.760

tered may make the operation of the circuit clearer. The batteries in the lower right bridge circuit represent the voltage supplied by the backout potentiometer and the potential of the pipe with respect to the reference electrode. If the bridge has first been balanced with respect to resistance (IR drops) the galvanometer V will read zero when the backout voltage equals the potential of the pipe.

After the bridge or null circuit has been balanced for a current to which it is sensitive, the current is reduced to a very small value. When sufficient time has elapsed for the vacuum-tube voltmeter to reach a steady state, the potential across it is backed out by means of the potentiometer resistor R_2 and the readings of the ammeter I and the voltmeter V are recorded. The rheostat R_1 is then readjusted to pass from 30 to 50% more current and a new balance is obtained. Thus a series of observations of E and I are accumulated. At first little or no change will be observed. Observations should be continued until four or more definite changes in E have been obtained.

Usually it will not be necessary to readjust the null circuit until after the critical current has been passed. In some cases the circuit becomes badly unbalanced for large currents. It is advisable to check the balance of the null circuit from time to time.

APPENDIX

The design and use of apparatus for applying the null method of determining the current required to prevent corrosion of a buried structure.

The following is a description of apparatus built and used by the author for determining the current required for the protection of buried structures. The apparatus is described because it works in a fairly satisfactory manner and can be constructed from parts easily obtained under normal conditions. No doubt better apparatus can be designed, especially if it is to be used under only one known condition.

Null, back-out and potentiometer circuits: Fig. 2 shows the details of the null and back-out circuits. The rheostat-potentiometers are stock articles designed for radio apparatus. Most of these have power ratings of from 6 to 10 watts and current-carrying capacity of 7 or more milliamperes. They were about 3 in. in diameter and 1½ to 3 in. high, not including the shaft and knob. The variable megohm resistor was much

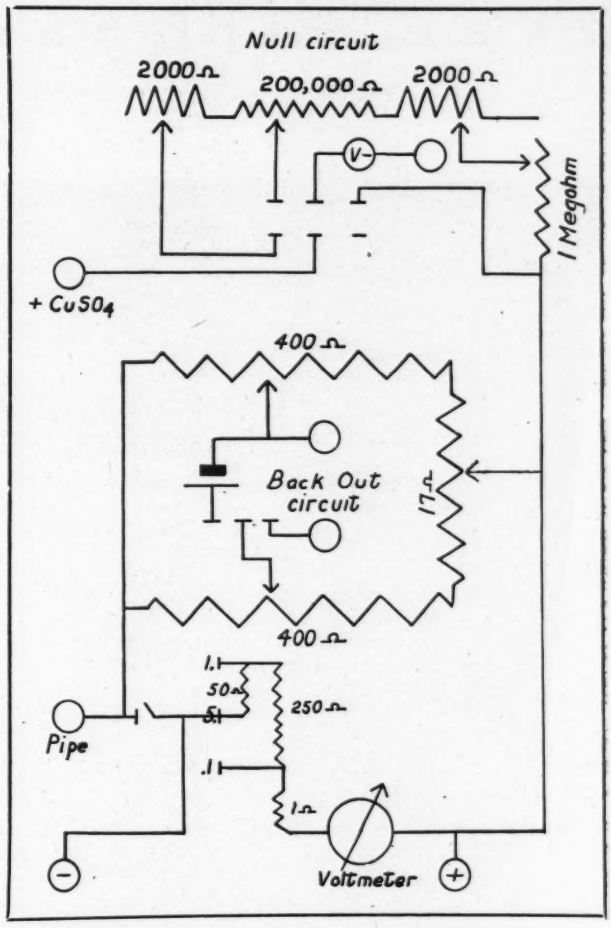


FIG. 2.
Details of NBS null and back out of potentiometer-voltmeter circuit.

smaller in size and current capacity. Hadley says it is unnecessary.

A switch makes it possible to open the null circuit and connect the vacuum-tube voltmeter, directly to the back-out circuit thus forming a potentiometer voltmeter.

The large number of rheostats resulted from a desire to keep the total resistance of the circuits nearly constant and to provide a coarse and fine adjustment of the potential at the terminals of the circuits.

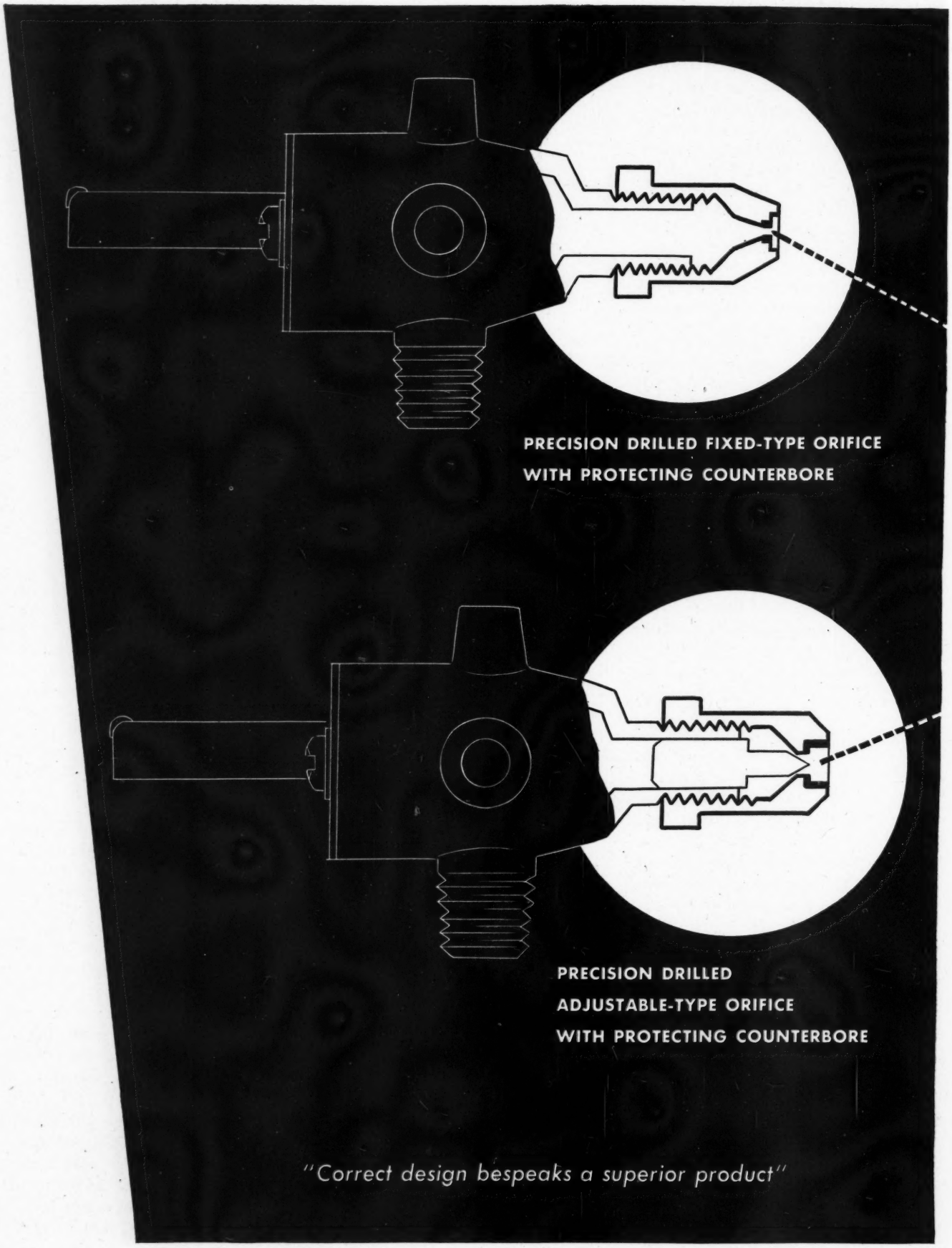
Ease of adjustment of the apparatus is important, if not essential, if accurate data are to be obtained quickly. The voltmeter used was originally a Western Model 269 milliameter. It was taken from some discarded apparatus. Series resistances were added to make the instrument indicate volts. A high resistance instrument and higher-resistance back-out rheostat would result in longer battery life or permit the use of a smaller battery. The one actually installed was a No. 4 F-J dry cell. The current drain is about 20 milliamperes. At this rate the battery should serve for at least 1000 hours. The apparatus is kept in a box 11 x 11 x 8 in. and has a total weight of 16 lbs., of which about 5 lbs. is apparatus and the remainder battery and case.

Vacuum-tube voltmeter circuits: Fig. 3 shows the circuits of the vacuum-tube voltmeter. The design is a modification of one by Garman and Droz 18. Another modification of this circuit has been described by Anderson and Hindman 19. Another design has been described by Pearson in his paper describing the null circuit. Pearson's design permits the use of a Weston Model 1 voltmeter or similar instrument as the voltage-indicating instrument. It has a greater range and sensitivity than the instrument to be described, but larger batteries are required for its operation and these increase its size and weight.

The potentiometer-rheostats in the Bureau of Standards' vacuum-tube voltmeter were similar to those used in the back-out or potentiometer-voltmeter circuit. The indicating instrument is a Weston Model 801 microammeter having a range of 50 microamperes and a resistance of about 900 ohms. A more sensitive meter with a higher resistance might be an improvement. At the maximum sensitivity the Bureau voltmeter gives a deflection of one scale division for about 2.5 millivolts. Higher sensitivity would be desirable if unaccompanied by some undesirable feature. As the voltmeter was first built, adjusting its zero position changed its sensitivity, and vice versa. Rheostats were added to make the adjustment of the zero and the sensitivity independent.

If the vacuum-tube voltmeter is to be used as an indicating voltmeter it must be calibrated each time it is used. A circuit was added to permit this if a reference voltmeter is connected across the terminals of the

What will the gas range of



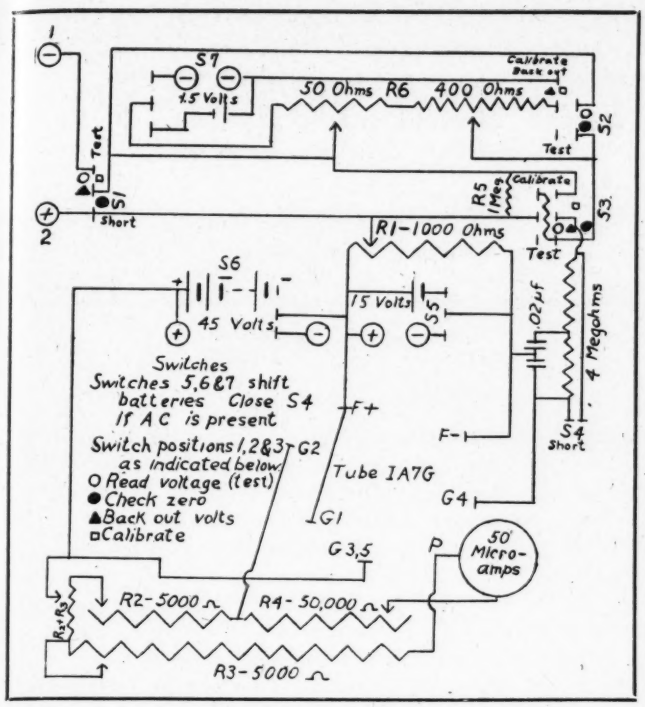


FIG. 3. Modified Garman and Droz vacuum tube voltmeter circuit.

vacuum-tube voltmeter. It was thought that it might be desirable to extend the range of the instrument by backing out part of the impressed voltage. Switches were so arranged that the calibration rheostat and battery could be converted into back-out apparatus. A filter was added to permit the use of the instrument to measure potentials supplied by a rectifier which does not furnish steady direct voltage.

All these additions complicated the circuits, increased the possibilities of trouble and added to the size and weight of the instrument, which has the same dimensions as the back-out instrument and a weight of 19 lbs., more than half of which is the weight of the batteries and case. Rough calculations indicate that an apparatus combining the two instruments could be placed in a single metal case in such a way that the combination using the same type of apparatus including the batteries would weigh about 25 lb. This weight could be reduced considerably if smaller rheostats, batteries and meters were used. Further reduction in weight could be made if the apparatus were constructed solely to obtain data for current-potential curves. It has seemed better to describe the apparatus which rendered satisfactory service rather than a more nearly ideal one which has not been tried out.

When the instrument described was used in a high wind it appeared to be affected by static. An instrument with a metal instrument board and case might be preferable.

Use of apparatus: At one test site the potentials seemed to be affected by the accumulation of alkali at the cathode. Under such conditions it is best to take readings of the instruments at equal time intervals so spaced as to allow time for the instrument to become steady, but not long enough to be affected by the drift attributed to the accumulation of alkali. Observations should be made with all changes in current in the same direction. It is desirable to check and if necessary to readjust the reading of the null circuit from time to time. This can be done quickly and without seriously interfering with the smoothness of the current-potential curve.

After a set of data has been obtained and the test current shut off, the open-circuit potential of the cathode may drift gradually for an hour or more and a repetition of the test may result in a value of the protective current which may be somewhat larger or smaller than the original critical value. Repetition of the test after current has been applied to the cathode for a long time usually results in a change in the critical current, due probably to the accumulation of alkili endosmosis and other changes at or near the electrodes.

These changes have been discussed by Darnielle (11) and others. It appears, therefore, that no single value of current is just sufficient for protection at all times and that redeterminations of the current required for protection should be made from time to time; at least until the tendency to change can be evaluated. It follows that exact determination of the current required for the protection at a given time is not essential. This is fortunate since such a determination might prove difficult to report or verify.

Although Garman and Droz state that the adjustment of the vacuum-tube voltmeter is extremely simple, the author has experienced considerable difficulty in obtaining a satisfactory adjustment of either the original Garman and Droz circuit or the modified circuit shown in this paper.

The adjustment of R_1 affects not only the zero position, but the stability of the zero. The ratio of R_2 to R_3 depends on the tube in use, and if a proper ratio is not obtained the zero position of the instrument shifts when the sensitivity of the instrument is adjusted by means of R_4. The sensitivity of the instrument varies with the tube and with the voltage of the batteries. The zero position of the instrument on short circuit is not the same as on open circuit.

However, with sufficient patience, experience and manipulation an operator can secure quite satisfactory performance of the vacuum-tube voltmeter as a null instrument.

The instrument built at the Bureau does not hold its zero well and frequent checking and adjustment are necessary. If this is done the instrument can be used as a high-resistance voltmeter but the calibration soon after each test is advisable. Possibly a steadier tube would make this unnecessary.

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POSTWAR NOTES and NOTIONS

By STANLEY JENKS

The Elder Statesmen

A fellow whose many activities make his interest in the gas industry only partial told me at the A. G. A. Annual Meeting that he was surprised, in fact shocked, at the predominance of old men present. Personally, I thought he was being facetious until he elaborated by making adverse comparisons with other industries in which he is active.

Is the implied criticism a fair one? One surely recognizes the peculiar circumstances surrounding this particular meeting and the limitations on a more typical cross-sectional attendance. Again, and as usual, the snappy comeback was several hours too late. I might have reminded him that few gas men can afford to retire early, if at all. Or I could have asked him to reserve his judgment until our next convention at Atlantic City, where only the boardwalk creaks when the lads relax.

An industry, seriously though, is only as old as its ideas, and only as senile as its accomplishments. So long as the gas industry progresses and takes its proper place in the scheme of things, the years of its "elder statesmen" are of little consequence. The danger signal is when evidence appears that old fogeyism is in the saddle. The industry's acceptance or rejection of the research and promotional million dollar plan will be the tip-off.

The New Plant

Of course, any gas utility executive who knows what the score is cannot help but support the plan for research and development announced by the A. G. A. Committee on Gas Industry Promotional Development at the A. G. A. Annual Meeting in New York, October 5. Only a million dollars a year for three years—and cheap at the price, if the committee only accomplishes one-half what it has in mind. In fact, it will be money well spent if it accomplishes *anything* (and it surely will), because there are certain things on the docket—production problems to be solved, utilization improvements to be made, and expanded usages to be developed—that no single gas company in the industry can solve alone, but from which no single gas company can fail to benefit.

The plan was well presented by A. G. A. President Ernest R. Acker, and, apart from allowable differences of opinion on petty details, I found an encouraging unanimity of approval among the first impressions aired.

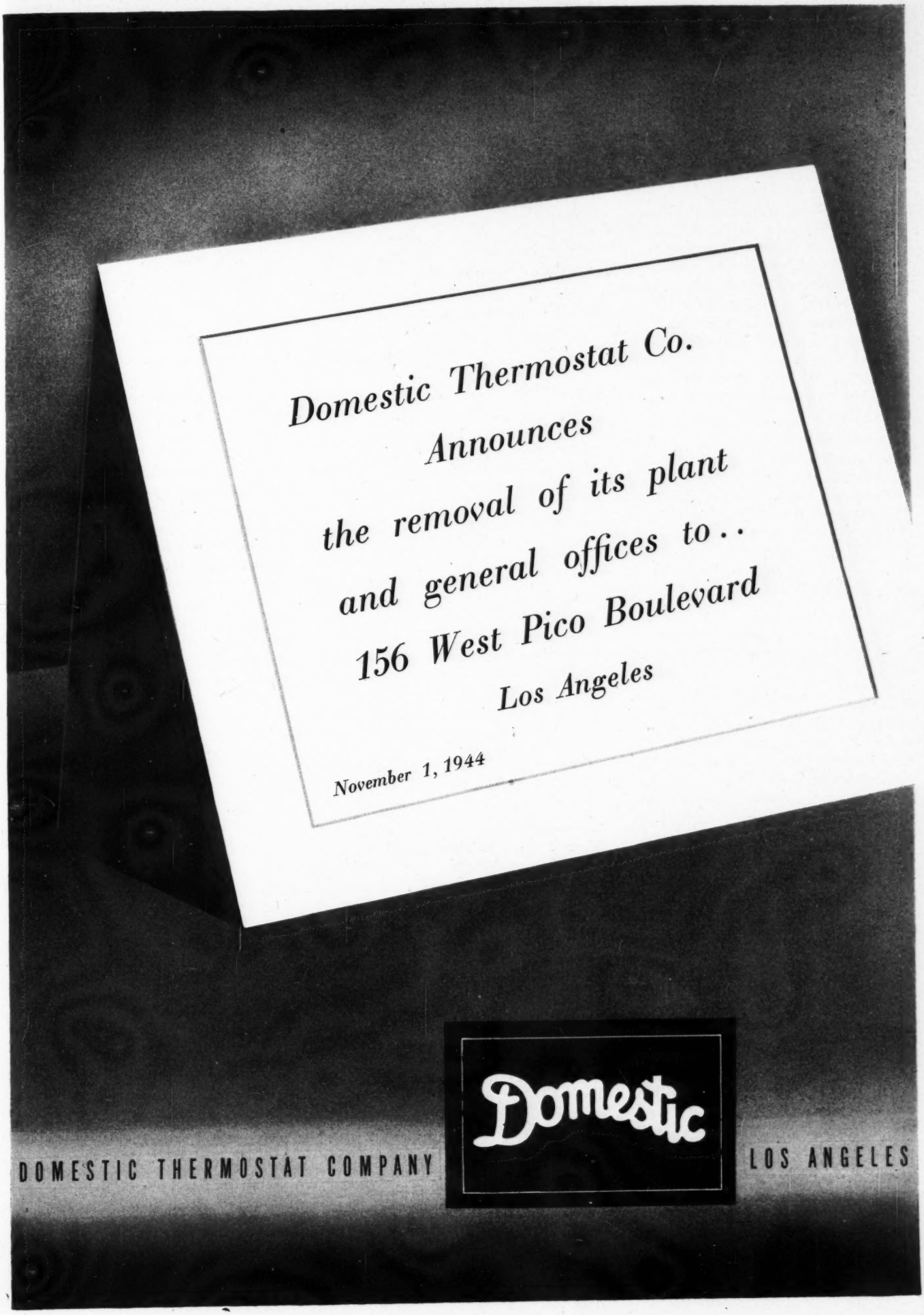
The budet itself: $200,000 for domestic, commercial, and industrial appliance research; $400,000 for general technical research, of which $350,000 will be applied to the problem of reducing manufactured gas production costs with the manufactured gas companies providing $270,000 of this amount; an additional $200,000 for national advertising, boosting the total to $800,000, if the appliance manufacturers contribute $200,000; and $200,000 general sales promotion and coordination.

The last item is the real innovation, because it recognizes at long last that we need whole-time professionals on the job, instead of trusting to the willing, but fleeting mercies of committees, the members of which at their best can neither spare the time nor energy in these hectic days to do the bang-up, follow-through job that the promotional part of this program must have to succeed.

The choice of the most fitting man to head the proposed Promotional bureau in A. G. A. headquarters is not going to be an easy one. A big-time operator with big time ideas and with plenty of room to maneuver is needed. Anybody less will be just more unaccounted-for gas.

Lower Gas Costs

Every manufacturer knows that product research is a long-shot bet on the brains of somebody to make an idea materialize into an asset. The gas industry is going to bet a minimum of $1,050,000 over the next three years on whether there is a cheaper way to make gas, or more explicitly, whether a lower investment cost gas manufacturing plant can be developed. The need is painfully apparent. The business is far too marginal these days for reasons quite familiar to those charged with operating it. Both the actual cost of making gas and the heavy fixed charges on the plant investment are proving embarrassingly burdensome. A greater volume of sales without peaking the system is sound in theory, but there must be some realistic basis to our sales promotion. Despite our superior fuel service, it must be realized that there are economic limitations on how much Mr. & Mrs. John Q. Public can *afford* to pay for cooking; for continuous care-free hot water service; for silent, dependable refrigeration; and healthy central heating and air-conditioning. Anybody who has tried to sell automatic gas water heaters in an average working class community with gas at 15 to 16c per therm knows what the score is. As George A. Neal, of Sioux City, said, we need a bargain in our incremental rate steps to get the volume. Such bargains will only be economically possible when we know how to get the gas into the holders at a lower price than today's technique makes possible. There is no post-war endeavor worthier than this. In fact, are we going to spend enough?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LOS ANGELES

What Women Want in Tomorrow's Kitchen

A LARGE postwar demand for appliances and kitchen equipment exists among the women of America, according to the findings of a survey just made public by "McCall's Magazine" under the title, "What Women Want in Their Kitchens of Tomorrow." This survey is based on detailed reports from 11,887 readers of this national women's magazine. Women from all states and sections of the country, from large cities, suburbs, small towns and rural districts have reported to the editors of "McCall's" just what they would like in their kitchens when equipment again becomes available.

The range market: Although gas ranges strongly dominate the present cooking scene, and electric ranges run far behind, yet electric ranges are on 58% of the buying lists of the women voting on the subject, with eager customers almost as numerous as those who are still undecided. The market lineup for gas ranges is only about half as great as that for electric models.

Clearly many women are not in acute need of new ranges—the tremendous interest in ranges in the period just before the war is reflected in the fact that over 59% of the present equipment dates from the past six years. If women buy a new range it will be because new products have persuasive qualities. Even so, both range and refrigerator markets promise activity, but slightly higher volome seems indicated for ranges.

On the other hand it is clear that the electric range has accomplished no such wholesale conversion as the electric refrigerator; in fact, 22% voice definite indifference to electric ranges.

Electric Refrigeration Favored: There is no denying that women have fallen in love with electrical refrigeration. Electric refrigerators dominate the scene, and in spite of the strong coverage made in pre-war years, healthy ready markets are awaiting new electric models when they appear. Ice boxes outnumber gas refrigerators in present ownership, but in the future market, gas refrigerators fare considerably better than ice boxes. Both, however, are faced with a sizable bloc who are opposed to them. Prejudice against ice boxes suggests a highly restricted market for this product.

Most kitchens boast some kind of refrigerator; only 7% indicated that they do not have one, and 80% of the present refrigerators being used have been bought within the past 10 years. This might look as though there would not be many customers for replacements, but a study of the survey reveals that many women are already interested in discarding their present refrigerator for a new one.

Although more than half the voters seem in favor of a separate frozen foods cabinet, yet many would prefer more frozen food storage capacity within the refrigerator. There will unquestionably be a market for both.

Dryers: On the subject of electric and gas dryers, a product is again being dealt with that has made almost no penetration into average homes, and the ready market figures for both are under 10%. It is not readily explained, however, why the immediate market for electric dryers is 9.5% and that for gas dryers is only 1%: nor why 50% of the voters respond favorably to electric dryers, while interest in gas dryers goes barely over 10%. One can only say that this unfamiliar product has yielded an extreme illustration of the kind of "electric fascination" that permeated the voting in several other lines. Obviously gas-appliance manufacturers must first cope with safety bugaboos and notions of up-to-dateness that sway women's minds on these matters.

Water Heaters: In spite of the fact that gas water heaters are preeminent in the present field, women do not show much enthusiasm for them. On the contrary, if they have their way, there will be a boom market for electric water heaters after the war. About 25% express lack of interest in them, but this vote has undoubtedly been influenced by operating costs and by the fact that electric water heaters have had less intensive promotion than ranges and refrigerators.

Dishwashers: There is not much doubt that women are attracted by the electric dishwashing idea. 59.8% of the contestants are watching dishwashers with a favorable eye and may be converted into customers if price and operation are right. The contest letters stressed over and over that women are tremendously anxious for a good dishwasher and there is probably no new kitchen development in which a successful mass product could achieve a more hearty welcome. Improvements will have to be made before the dishwasher can achieve volume sales, and manufacturers are already familiar with the general complaints that dishwashers do not save enough time or take care of all of the dishes;that they are rough on good dishes and not always good cleaners; that they cost more than they are worth.

Waste Disposers: Votes for electric waste disposers fall into patterns quite similar to those for electric dishwashers. Here again it is a product about which women are not well informed, but the more knowing speak of plumbing problems with waste disposers and of limitations in the dishwasher's performance.

Kitchen ventilators get a strong hand in the report. It is called a necessary feature by 42.5% of the women, and whereas the built-in types get a landslide vote, women with old houses might compromise on a portable unit because of expenses.

Ranges: The style poll for ranges brings to light the great success of the flat topped stove. 69% of the kitchens have it and its popularity has not passed the crest. Women want their ovens to have glass doors, and they want light in the oven, as shown by an approval vote of 82.6%. The wide, shallow oven is another "extra" which appeals to more than 75% of the voters. This reaction ties in closely with the vote on refrigerator design —cooks like to see and get at their pies and cakes easily.

It is hard to dislodge a formula that has persisted for a long time—often only actual use of new products will accomplish the change. The close grouped planning of four top units at one side of the range remains the choice of nearly 50% of the women. However, the other 50% are ready for less conventional arrangements.

There was almost unanimous protest against square pots and pans from those who commented on this feature; yet when asked the question, "If square heating units gave greater efficiency, would you be willing to discard all your pots and pans to buy a range requiring special square pots designed to fit units?" almost half of the women are willing to conquer their former prejudices and accept a new development.

Range accessories are desirable but not essential to most women. The one exception is automatic heat control—

here, there is practically no opposition. An automatic gas oven lighter proved to be the most controversial item.

The most numerous comments voicing complaints relate to the age and quality of the range; next in importance are the complaints on either size or design, but to offset the long and varied list of complaints is the fact that over 3,000 women listed none. On the contrary, they find their ranges "marvelous."

Very few women wish their future color schemes limited by definite hues in equipment, hence the landslide for white ranges and refrigerators. White has become so completely identified with major equipment that it gets a check from four-fifths of the voters. Should the open-planning principle for floor arrangement which has had a high degree of acceptance in recent years, extend to include kitchens, there might be a change in this. The fact that 9% of the women are anxious to have completely open layout in their new homes, means there will be some immediate market for kitchen equipment which departs radically from the white clinical type of recent years.

Refrigerators: It is no surprise to find that few women think their refrigerators "too large"—the marvel is that nearly 59% find them "just right." The trend has been toward larger and larger boxes and it is possible that when the frozen food compartment is increased in size, the six foot model will cease to be adequate.

One of the interesting victories of new design in the contest was the landslide given the wide shallow refrigerator. It triumphed almost three to one over the familiar deep one-door style. If the cost of production of such a refrigerator could be controlled, an excellent reception would await such a convenient model.

If manufacturers continue with single-door types of refrigerators, models should be available with both right and left hand openings, for according to their letters, more than 75% of the women do care which way the refrigerator door swings.

An overwhelmingly high percentage of contestants are doing their own housework and preparing meals—more undoubtedly than were a few years ago, which means that some women are seeing kitchen defects which they might otherwise have overlooked. A change in the domestic help situation in postwar years together with the whole American trend away from the servant regime, might alter some plans for kitchen progress.

Gorton to Direct CP Range Program

THE appointment of James I. Gorton as promotion director of the "CP" Gas Range Program, was announced by Lloyd C. Ginn, chairman of the "CP" gas range manufacturers division of the Association of Gas Appliance & Equipment Manufacturers.

James I. Gorton

Based on the increasing interest shown in the "CP" program by utilities and dealers, manufacturers of ranges bearing the "CP" seal announced an increase in their promotional budget for the first six months of 1945 at a meeting held in the Waldorf Astoria Hotel in New York City on Oct. 6, 1944.

The major part of the "CP" advertising appropriation will be used to support the $6,000,000 national and local newspaper advertising program now being carried on by the gas industry. Full page "CP" advertisements will be scheduled in trade publications covering the appliance dealers, furniture, hardware, and department stores, and the architectural and building fields.

A dealer promotional package will be avaiable to utilities for distribution to their dealers. This kit will contain a complete pre-selling program, window displays, newspaper advertising mats, guides to the selection of salesmen, guides to store planning, and preliminary sales training material.

95% of all gas utilities have indicated their intention of aggresively promoting gas ranges bearing the "CP" seal. In the last three months alone, more than 5000 dealers have requested and received "CP" promotional material to use in preselling their customers, according to Mr. Ginn.

The "CP" program was inaugurated in 1938 to create new higher standards for gas ranges, and to provide the consumer with an easily recognizable buying guide.

"The 'CP' seal is the trademark of the Association of Gas Appliance & Equipment Manufacturers. Only gas ranges built by a member of the Association to specifications drawn up to the highest standards of leading home economists and engineers, may bear this seal. To make certain they meet these specifications, gas ranges bearing this seal are pre-tested by laboratories of the American Gas Association, or by other attested laboratories.

A. G. A. to Hold Regional Sales Clinics

A SERIES of seven regional sales clinics covering the selection and training of gas appliance salesmen and the Coordinated Kitchen Program has just been announced by the Residential Section of A. G. A.

Sponsored jointly by the Committee on Selection and Training of Sales Personnel headed by R. E. Williams of Binghamton, N. Y., and the Committee in Charge of the Coordinated Gas Kitchen Program, headed by J. J. Quinn of Boston, one-day meetings have been arranged in various parts of the country. Approximately one-half day's time will be devoted to each subject.

Following is the schedule of dates and meetings arranged:

City	Hotel	Date
Boston, Mass.	Copley-Plaza	Nov. 30
New York City	Biltmore Hotel	Dec. 1
Pittsburgh, Pa.	William Penn	Dec. 4
Chicago, Ill.	Palmer House	Dec. 6
Kansas City, Mo.	Phillips Hotel	Dec. 8
Dallas, Texas	Baker Hotel	Dec. 11
Atlanta, Ga.	Atlanta Biltmore	Dec. 14

Morning sessions will be devoted to the salesmen's selection program as an aid to sales managers in upgrading domestic appliance salesmen. Featured at the sales training meetings will be Dr. Robert McMurray, consultant for Servel, Inc. The program on the Coordinated Kitchen will be in charge of H. Vinton Potter.

Invitations to these meetings are being mailed to all gas companies by the A. G. A. together with an outline of the program and requesting advance registrations of those who will be in attendance. Invitations may be obtained from the Secretary, Residential Section, A. G. A., 420 Lexington Avenue, New York, N. Y.

• **Cities Service Co.,** Bartlesville, Okla., has received the highest Merit Award presented by Financial World for its annual report to stockholders. The company's thirty-fourth annual report was distinguished by several new departures in the use of illustrations, typography and simplified handling of various features. The award is considered an outstanding recognition.

Mid-West to California Gas Line Confirmed

THE long-rumored proposal to bring Texas gas to California was confirmed Oct. 12 with the announcement that the Pacific Gas & Electric Co. together with Pacific Lighting Corp. and its subsidiaries, is considering a plan to build a 1000-mile pipe line, costing $60,000,000, from the Panhandle and Hugoton gas fields to Los Angeles. (Gas, Oct., 1944, p. 82)

First official word of the development came in a registration statement filed with the Securities and Exchange Commission by the PG&E, preliminary to the issuance and sale of $115,000,000 of refunding bonds. In its application, the PG&E stated:

> "In order to augment the supply of gas available to gas companies operating in California, the Company and certain southern California gas companies are now considering a plan for purchasing natural gas in Texas and transporting it by pipeline to California."

Preparations are now being made to seek necessary approval of the plan from the Federal Power Commission. It is proposed to organize a company, owned jointly by the PG&E and Pacific Lighting, to be known as the Texas-Pacific Pipeline Company.

The pipeline would tap dry gas fields in proven areas totalling 4,500,000 acres and having estimated reserves of approximately 40 trillion cu. ft. of gas. Western terminus of the line would be near Los Angeles, a distance of about 993 miles from the source of supply. Proposed route would be across New Mexico and Arizona.

An application for the allocation of the necessary steel has already been made to WPB, it is stated. Preliminary plans call for the installation of 27¼-in. outside diameter pipe, together with four compressor and booster stations. Construction would begin immediately on receipt of authorization from appropriate government agencies, and it is indicated that the companies would like to get the line into operation by the winter of 1945-46.

The new pipeline, which would be the largest diameter long distance pipeline in the country, would be able to make available an additional 200 to 300 million cu. ft. of gas for distribution in California. California is one of the largest users of natural gas in the United States, consuming 15% of natural gas used in the nation.

PHILLIPS "LPG"

FOR BETTER, MORE ECONOMICAL GAS SERVICE

A Message to Executives of Gas Service Companies Who Have High Production Costs

You will be interested to know that large savings may be effected by the use of Phillips Liquefied Petroleum Gases in your gas manufacturing operations. Phillips engineers have pioneered the use of LPG for gas manufacturing operations. We are ready to study your problem and give you reliable, specific recommendations. We invite you to contact our nearest Philgas branch office today. There's no obligation, of course.

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Branch Offices in NEW YORK, CHICAGO, PHILADELPHIA, DETROIT, ST. LOUIS, MILWAUKEE, SHREVEPORT, LA., AMARILLO, TEX., HIBBING, MINN.

The World's Largest Marketer of Liquefied Petroleum Gas

Employment Discussed by Ruthenburg in SEP Article

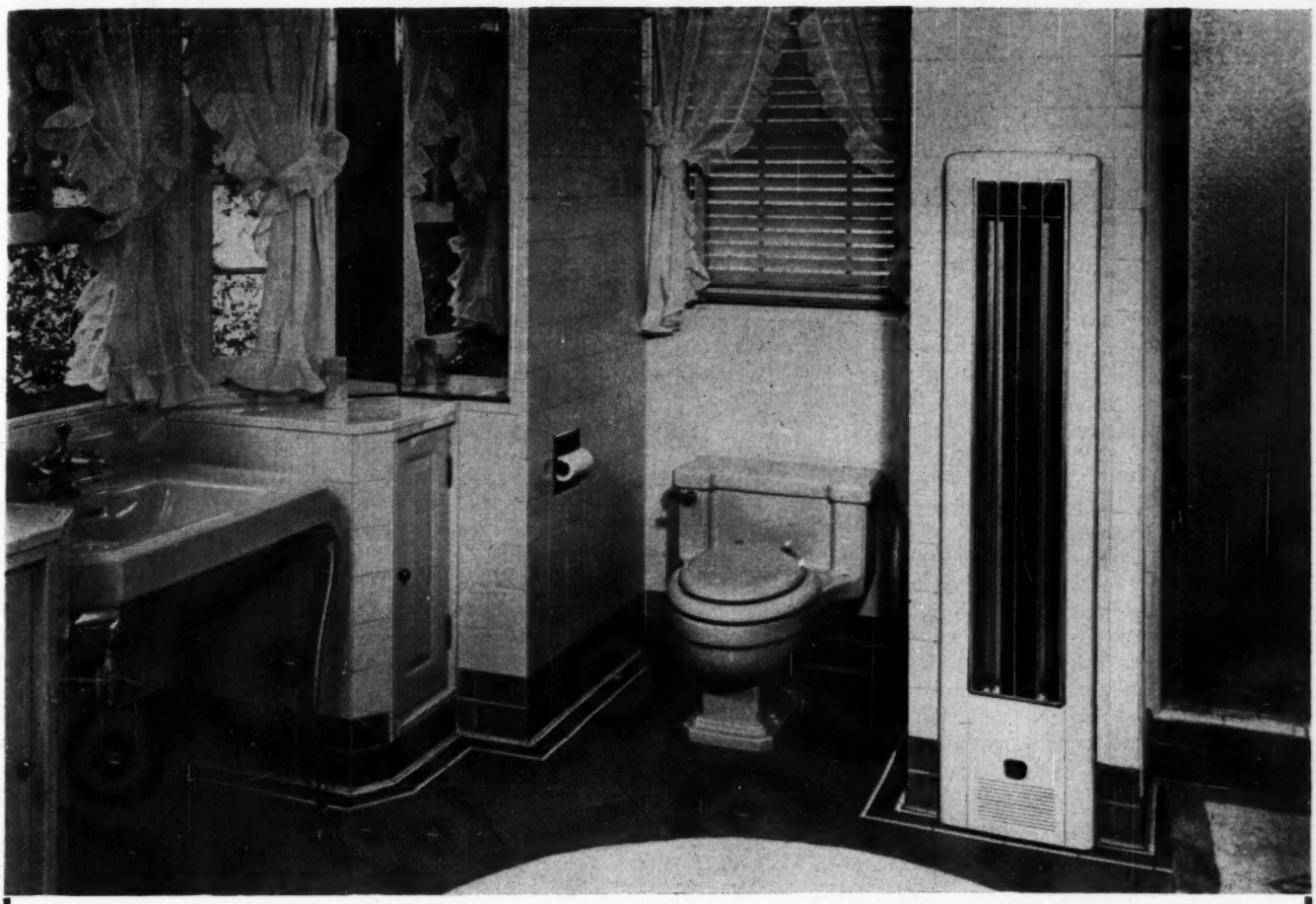
Expressing a view that government control of raw material and retail prices should be continued after the war, Louis Ruthenburg, president of Servel Inc., Evansville, Ind., wrote an article entitled, "Maximum Total Employment Should Be Our Aim", in the September 16 issue of the Saturday Evening Post.

In his article, Mr. Ruthenburg emphasized that these price controls should be continued only as long as a scarcity of labor and materials remains, not an hour longer.

In this issue of the Post Mr. Ruthenburg shared honors in a double page layout with Maury Maverick, former Congressman from Texas and Chairman of the Smaller War Plants Corporation. Mr. Maverick wrote on the subject, "Small Business Must Get the Breaks."

New Kentucky-Indiana Gas Set-up Authorized by FPC

FPC has authorized Indiana Utilities Corp., Corydon, Ind. to operate natural gas facilities acquired from Kentucky Pipe Line Co. for $12,500 and has authorized Louisville Gas and Electric Co., Louisville, Ky., to sell and deliver natural gas for resale to Indiana Utilities at the Kentucky-Indiana State line near Louisville, in an amount not to exceed 500 Mcf per day.



NEW INFRA-RED VENTED GAS HEATER

Nature's own heating method of warmth through radiation of infra-red rays has been adapted to provide the gas industry with a new, efficient panel wallheater. This modern PANELRAY gas heater sends out millions of infra-red rays which provide immediate warmth and comfort in the "living zone" of the room.

Installation is simple as the heater stands entirely above the floor, requires no floor cutting or substructure. It comes in a "package" ready to install in either a new or old building, upstairs or down or in the basement. The PANELRAY is available in single units of 10, 20, or 30,000 BTU and dual units of 20, 30 or 40,000 BTU.

The new PANELRAY heating principle has a tremendous sales appeal. It is low in price, easy to install and highly efficient because of Day & Night's patented "heat trap" flue.

WRITE FOR FULL COLOR BOOKLET GIVING COMPLETE STORY

DAY & NIGHT MANUFACTURING CO.

MONROVIA, CALIFORNIA

ASSOCIATIONS

Research Plan Presented at A. G. A. Meeting

PRESENTATION to the industry of the long awaited plan for research, advertising and general promotion was the one outstanding piece of business to come before the greatly curtailed twenty-sixth annual meeting of the American Gas Association, in the Engineering Society's Building, New York City, the morning of Oct. 5.

Characterized by retiring president Ernest R. Acker as the biggest effort in the history of the association, the plan is designed to bring gas industry advertising and promotional activity under association auspices up to the level of nearly a million and a half dollars in annual expenditures, as compared to the $400,000 currently being spent on national advertising.

Appliance research is to have a budget of $200,000 per year, with technical research, mostly designed to lower the cost of manufacturing gas, slated for $400,000. National advertising, an activity which is expected to have the support of the appliance manufacturers to the tune of $200,000 will be stepped up from the present $400,000 to a new budget of $800,000 per year.

A general sales promotional bureau is to be organized at A.G.A. headquarters, at a cost of $100,000 for the bureau, and another $100,000 for the development and execution of industry-wide sales promotional programs.

In appealing for support of the plan, president Acker stressed the fact that the gas industry, and particularly the manufactured gas side of the industry is falling in the estimation of the investment bankers, a fact that makes needed new investors increasingly difficult to attract. He also painted the picture of stepped up electrical competition striving to make the most of its new increased generating capacity looking for postwar markets.

Other industry executives spoke in unreserved and enthusiastic support of the promotion plan. A. F. Bridge, vice president of the Southern Counties Gas Co., Los Angeles, observed that the gas industry must now demonstrate its faith in its own future by undertaking the new promotional activities. F. H. Lerch, Jr., president of the Consolidated Natural Gas Co,. New York endorsed with particular emphasis the research activities that are contemplated. T. J. Strickler, vice president of the Kansas City Gas Co., Kansas City Mo., observed that the national advertising program, now entering its ninth year, was the forerunner of the present project. Dean H. Mitchell, president of the Northern Indiana Public Service Co., Hammond, Ind., hoped that the promotion bureau might be able to assist manufacturers in styling appliances, particularly ranges, for more style appeal. He pointed out that an appliance that has lost its style appeal has lost its ability to repell electrical competition.

Earl H. Eacker, vice president of the Boston Consolidated Gas Co., Boston, Mass., stressed the necessity for the few delegates present at the meeting taking the promotional proposals out and selling them to other gas company executives whose approval will be necessary if the plan is to gain the necessary financial support. John B. Klumpp, consulting gas engineer of Philadelphia and R. L. Pattinson, president of The Central Pipe Line Co., Chatham, Ontario also warmly endorsed the scheme.

Singing what may well prove to be the OWU swan song as far as the gas industry is concerned, Edward Falck, director of the Office of War Utilities, War Production Board, outlined in brief the government's plans to lift gas industry controls after allied victory in Europe. He predicted that Order U 1 will be revoked and gas companies permitted to go ahead on plant and system repairs and new construction without restriction. Orders L-174 and U 7 will also be repealed, lifting restrictions on service to new space heating installations and new users in any other classification.

Any controls that may have to be exercised by the OWU in the opinion of Mr. Falck will take in the form of a use of WPB priority powers for the purpose of protecting military requirements and supporting war activity until the Pacific phase of the conflict has been successfully terminated. Mr. Falck was warm in his praise of the harmony and cooperation that have signalized gas industry and government unity in furtherance of the war effort.

Following the report of the general nominating committee, J. French Robinson, president of the East Ohio Gas Co., Cleveland, was advanced from his post of vice president and chairman of the Natural Gas Department to the postiion of president of the A.G.A. E. J. Boothby, vice president and general manager of the Washington Gas Light Co. was elected first vice president of the association, R. H. Hargrove, vice president of the United Gas Pipe Line Co., Shreveport, La., was elected second vice president. Edward F. Barrett, president of the Long Island Lighting Co., Mineola, N. Y. was elected treasurer of the association.

For his heroic action in preventing an explosion in an oil refinery fire, Michael Keane, fitter employed by the Pacific Gas and Electric Co., San Francisco, Cal., was awarded the A.G.A. Meritorious Service Medal, a

At the October meeting of A.G.A.: First vice president-elect E. J. Boothby, Washington Gas Light Co.; Retiring President Ernest R. Acker, Central Hudson Gas & Electric Corp.; Poughkeepsie, N. Y.; President-elect J. French Robinson, East Ohio Gas Co., Cleveland; Second vice president-elect R. H. Hargrove, United Gas Pipe Line Co., Shreveport.

Put it to work for you

This Attractive GAS KITCHEN Booklet

Here is a new booklet about the use of gas, the ideal fuel—an interesting, attractive booklet that commands attention and presents a powerful message that will have widespread favorable reaction with every reader.

It creates a desire for gas cooking, gas refrigeration, gas water heating, gas home heating, gas air conditioning. Emphasis is concentrated on six smartly designed kitchens in full color.

Order a free sample copy of this booklet. Learn how it can be used effectively with prospects, architects, builders, building and loan associations, apartment house owners and others in your community. It packs a punch that will pave the way for even more enthusiastic acceptance of gas appliances in the days ahead.

GAS

ROPER
GAS RANGES

GEO. D. ROPER CORPORATION, Rockford, Illinois, manufacturer of ROPER, "America's Finest Gas Range," for all gases including L.P. (Liquefied Petroleum) gas.

Offices and Warehouses in Atlanta—Chicago—Cleveland—Dallas—Denver—Los Angeles—Oakland—Philadelphia

NEW A. G. A. OFFICERS FOR 1944-1945

President: J. French Robinson, president, The East Ohio Gas Co., Cleveland, Ohio.

First Vice President: E. J. Boothby, vice president and general manager, Washington Gas Light Co., Washington, D. C.

Second Vice Presidents R. H. Hargrove, vice president, United Gas Pipe Line Co., Shreveport, La.

Treasurer: Edward F. Barrett, president, Long Island Lighting Co., Mineola, N. Y.

Directors: (two-year terms): R. G. Barnett, vice president and general manager, Portland Gas and Coke Co., Portland, Ore.; John W. Batten, president, Michigan Consolidated Gas Co., Detroit; Arthur F. Bridge, vice president, Southern Counties Gas Co., Los Angeles; James A. Brown, vice president, The Commonwealth & Southern Corp., New York; D. W. Harris, president, Arkansas Natural Gas Corp., Shreveport, La.; Lyle C. Harvey, president, Bryant Heater Co., Cleveland; Norton McKean, president, American Meter Co., Albany; Hudson W. Reed, president, The Philadelphia Gas Works Co.; Herman Russell, president, Rochester Gas and Electric Corp., Rochester, N. Y.; T. J. Strickler, vice president and general manager, Kansas City Gas Co.; P. S. Young, chairman, Executive Committee, Public Service Electric and Gas Co., Newark, N. J.

Section Officers

Accounting Section: Chairman—C. E. Packman, Middle West Service Co., Chicago; Vice-Chairman—E. F. Embree, New Haven (Conn.) Gas Light Co.

Residential Gas Section: Chairman—J. H. Warden, Oklahoma Natural Gas Corp., Tulsa; Vice-Chairman—J. J. Quinn, Boston Consolidated Gas Co.

Industrial & Commercial Gas Section: Chairman—Harry K. Wrench, president, Minneapolis Gas Light Co.; Vice-Chairman—Harry A. Sutton, Asst. Gen. Ind. Fuel Rep., Public Service Electric & Gas Co., Newark, N. J.

Manufacturers' Section: Chairman—Frank J. Hoenigmann, executive vice president, Cribben and Sexton Co., Chicago.

Technical Section: Chairman—L. E. Knowlton, Providence Gas Co., Providence, R. I.; Vice-Chairman—Lester J. Eck, Minneapolis Gas Light Co.

distinction that is conferred only when great heroism and disregard for personal risk have been displayed. In the absence of Mr. Keane, R. E. Fisher, vice president of the P. G. & E. received the award in his behalf

The annual meeting adjourned shortly after noon having established what will probably be an all time low in attendance, the result of the voluntary cooperation of the association's directors with the Office of Defense Transportation.

AGAEM Meeting

FALLING a near casualty to O.D.T. insistence that the railroads of the nation be spared the task of hauling convention delegates during the semi-final rounds of the war, the Association of Gas Appliance and Equipment Manufacturers held skeleton sessions in New York City timed to coincide with the annual meeting of the American Gas Association.

Divisional meetings were held on Oct. 5 and 6, with the annual business meeting in the form of a general luncheon presided over by retiring president Willard F. Rockwell, Pittsburgh Equitable Meter Co., Pittsburgh. In a brief retiring address president Rockwell introduced incoming president Lyle C. Harvey, of the Bryant Heater Co., Cleveland, who spoke on the postwar outlook of the gas appliance industry. President Harvey sees a possible continuation of some modified form of government control over business, with the possibility of floors under prices, instead of price celings, to encourage the continuation of high incomes and high purchasing power. He believes that there will be a considerable influx of new manufacturers starting to make gas appliances for the first time, a condition that will make for spirited competition within the industry as well as from the outside. He endorsed the new plan of the A.G.A., with which A.G.A.E.M. is affiliated, to raise an additional million dollars a year for research advertising and general industry promotion He declared that appliance manufacturer participation should be made a full association activity, warning his audience that the A.G.A.E.M. must decide now whether it is to go ahead or go back. It cannot stand still."

Stanley E. Little, vice president of the American Stove Co., took up the argument in behalf of the proposal that the A.G.A.E.M. contribute $200,000 toward the support of the industry promotion program. Declaring that heretofore he had opposed direct contributions by the manufacturers toward the utilities advertising schemes, he said that the new evidence of increased expenditure by the utilities bespoke the support of the appliance and equipment groups.

H. Leigh Whitelaw, secretary of A.G.A.E.M. reported that membership had increased during the past year from 231 to a present total of 259. He also warned the industry of the danger of continued war controls being kept operative after the war if the present anti-business philosophy prevails in the nation's capital.

H. Vinton Potter, director of the coordinated kitchen program of both A.G.A. and A.G.A.E.M, outlined the work that is being done in this activity to bring about the association of the idea of modernization with that of gas in kitchen planning.

A promotion campaign similar to CP is being taken into consideration by the house heating division of the organization. Similarly the water heater division has been discussing the possibilities of a CP water heater promotion for several months.

IOCC Discusses Controls

OIL and gas producing states were warned against a threat of a continuation of federal control after the war and were urged to take immediate steps to strengthen their conservation laws and regulations as a defense against such possibilities, in resolutions adopted unanimously by the Interstate Oil Compact Commis-

Charles L. Orr, secretary, Independent Natural Gas Association of America; W. H. Wildes, Dallas; E. Buddrus, Chicago, Association President, and Mark H. Adams, Wichita. The latter three constitute the advisory committee of the Independent Natural Gas Association to cooperate with the Interstate Oil Compact Commission.

sion, meeting at Oklahoma City, Okla., October 5-7.

Resolutions also were adopted recommending that the United States Senate refuse to ratify the proposed Anglo-American Oil Agreement, submitted to that body by the President on August 24, 1944 and now pending in the foreign relations committee of the Senate.

Another resolution commended two reports of the United States Bureau of Mines relating to secondary recovery through water flooding in Kansas and Illinois and recommended that this type of work by the bureau, in cooperation with the oil and gas producing states, be expanded as rapidly as possible and made available to the industry.

A report of the Research and Coordinating Committee of the Compact Commission was unanimously adopted which recommended:

"The committee considers adequate bottom hole pressure information essential to the proper control of certain types of reservoirs. Since the type of recovery mechanism, which is to be effective in a pool, is seldom apparent in the early stages of development, it is recommended that bottom hole pressure data be systematically obtained in all new pools until it has been determined whether pressure control will be feasible."

The committee decided during its meeting that its next meeting will be devoted to a discussion of proration formulas.

The Public Lands Committee, Warwick M. Downing, of Colorado, Chairman, in a report to the Commission, expressed disapproval of the Surplus Property Act, passed recently by Congress, which provides that if lands are purchased by other than the original owner, or by veterans, the mineral rights would be reserved to the government. The committee expressed alarm at the extent of government ownership of lands and mineral rights and recommended that public lands states should give immediate study to the subject and agree upon a form of an entirely new act of Congress concerning the development and disposal of public lands.

Fifteen states were represented at the Interstate Oil Compact Commission meeting held in the Biltmore Hotel. Thirteen of these states, Arkansas Colorado, Illinois, Kansas, Kentucky, Louisiana, Michigan, New Mexico, New York, Ohio, Oklahoma, Pennsylvania and Texas, are members, through ratification of their legislatures and appointment of official delegates by their governors. Two additional states, California and Florida, had unofficial observers in attendance.

Also present were about 200 representatives of oil and gas producing pipeline and distributing companies. Among the official representatives were several governors, former governors and members and employees of regulatory bodies of the various states, which are operating oil and gas conservation departments. The Interstate Oil Compact Commission has grown, since its birth in 1935, with six member states, to become an important interstate body with 13 states represented.

H. Vinton Potter, American Gas Association, New York; E. C. Joullian, president, Oklahoma Utilities Association, Oklahoma City; R. L. Weinnan,, Servel Inc., Oklahoma City and L. A. Farmer, Chairman of the Gas Division, Ponca City.

Oklahomans Talk Sales

ALTHOUGH there probably will be an unprecedented demand for household equipment and appliances following the end of the war in Europe, gas utilities and dealers must be alert and aggressive if they successfully meet the keen competition of other fuels and other commodities, speakers agreed during the annual meeting of the Gas Division, Oklahoma Utilities Association, at the Biltmore Hotel, Oklahoma City, Okla., September 22.

Subjects relating to the gas appliance and equipment merchandising situation dominated the program. Two of the papers, however, bore down on safety problems, some of them rendered more serious because of rapid building of war housing and overcrowded conditions in older homes, tourist camps and lodging places.

L. A. Farmer, president, Northern Oklahoma Gas Co., Ponca City, Okla., presided over the morning and afternoon sessions as chairman of the Gas Division. E. C. Joullian, president of the Consolidated Gas Utilities Co., and president of the Oklahoma Utilities Association, presided at the noonday luncheon and entertainment. Miss Kate A. Niblack, association secretary, reported attendance at 150.

In Oklahoma where the public utility company is barred by law from the field of gas and electric appliance and equipment merchandising, close cooperation between the gas utility companies and gas appliance manufacturers and dealers in particularly necessary, Pierre Vinet, George D. Roper Corporation, Rockford, Ill., pointed out. He assured his hearers that the manufacturers will furnish them as quickly as possible and in quantities as much as they can sell, appliances and equipment which will require a minimum of service.

Cooperation between the gas utility and dealers also was emphasized by Chester L. May, vice president, Lone Star Gas Co., Dallas. He described a co-operative plan which his company had worked out particularly with dealers handling appliances in sections of Oklahoma served with gas distribution by the Lone Star. The company's policy is to assist the dealers in securing the right kind of appliances and in successfully merchandising and servicing them, particularly in small towns and communities, through advertising and other help from the utility.

H. Vinton Potter, American Gas Association, New York, called special attention to the coordinated gas kitchen program and warned dealers in gas appliances and equipment that they must be prepared to meet the keenest competition from other fuels in order to increase their share in the household heating and cooking load. While there will exist after the war almost an unlimited reserve of buying power this market will be distributed among many varieties of household goods and appliances and the gas companies must be ready to demonstrate the superiority of their

services and appliances to meet certain household needs.

Mr. Potter estimated that building of new homes to relieve the housing shortage, and the wearing out of present appliances will create a demand for 10,000,000 gas ranges shortly after the war and for three or four million more of these appliances each year for several years.

Exploring the field of all-year air conditioning, Roy L. Weinman, Southwestern representative, Servel, Inc., Oklahoma City, said that a comprehensive sales plan had been adopted by his company applying particularly to conditions in Oklahoma where the gas utilities cannot sell such equipment. He stated that in Oklahoma the gas utilities are cooperating with dealers by furnishing engineering services and in advertising.

Accomplishments of the National and War Manpower Commission foremanship courses in reducing the high accident rate, which attended the speeded-up war production job during the first year and a half of the war, were reviewed in a paper on "Safety Problems, War and Post-War" presented by R. S. Huffman, safety director, Oklahoma Natural Gas Co., Tulsa. During that period, he stated, loss of manpower due to accidents amounted to 485 million hours—four times the amount of lost time caused by strikes during that time. He also declared that from the date of Pearl Harbor to June 1944 the number of deaths due to home front accidents was between four and five times the number killed in the armed forces from all causes.

★

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To take care of enormous expansion in our combustion engineering business.

We have been prominent in the development and manufacture of gas and oil burners and automatic control systems for industrial boiler plants and heating plants for over twenty years and have reached the point where we must expand to take care of the ever increasing demand for our products.

We can place experienced men in permanent key positions in selling, engineering, servicing and installing, gas and oil burners and controls.

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Industrial Gas Breakfast

The annual industrial gas breakfast meeting, sponsored by the industrial and commercial gas section of the American Gas Association, in conjunction with the National Metal Congress, held this year in Cleveland, was the largest gathering of its kind that has been held to date, with a total attendance of 160.

Harry K. Wrench, of the Minneapolis Gas Light Company, who presided at the speakers' table and was subsequently elected chairman of the industrial gas section of A. G. A. for the coming year, introduced industry members and guests who spoke briefly to the metals men.

Greetings and a welcome to Cleveland by J. French Robinson, as president of the American Gas Association as well as of the East Ohio Gas Company, was followed by observations on the history of gas heat treating by William Parks Woodside, past president of the American Society for Metals. John W. Batten, A. G. A. chairman of the committee on industrial gas research presented the new industrial gas research bulletin, "Physical and Metallurgical Effects of High Speed Direct Air-Gas Heat on Metals."

Professor W. Trinks of Pittsburgh, spoke on sidelights in industrial heating, and the closing discussion was a symposium of brief talks by the manufacturers of gas fired heat treating equipment. Carl H. Lekberg, chairman of the A. G. A. committee on heat treating with gas, was the leader.

A.G.A. Appoints Committee To Cooperate With IOCC

The American Gas Association has appointed an advisory committee to cooperate with the Interstate Oil Compact Commission in matters of mutual interest, E. G. Dahlgren, acting secretary of the Compact Commission announces.

Members of the A.G.A. committee are: E. L. Rawlins, chairman, Union Producing Co., Shreveport, La.; C. U. Daniels, Oklahoma Natural Gas Co., Tulsa, Okla.; J. P. Dickinson, Texoma Natural Gas Co., Amarillo, Texas, and R. E. Wertz, Amarillo Gas Co.

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Every part that goes into a Rheem Automatic Water Heater is designed and built by Rheem . . . tanks, burners, controls—they're *all* made by Rheem.

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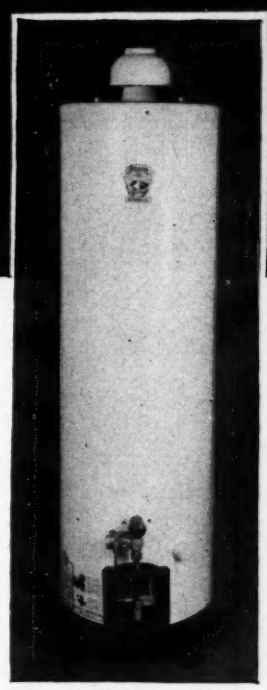
Rheem Automatic Water Heaters are made for *all* types of fuel—gas, bottled gas, electricity, oil and coal. They are moderate-priced and *reliable*.



Now available... Rheem Arrowhead Automatic Gas Water Heater.

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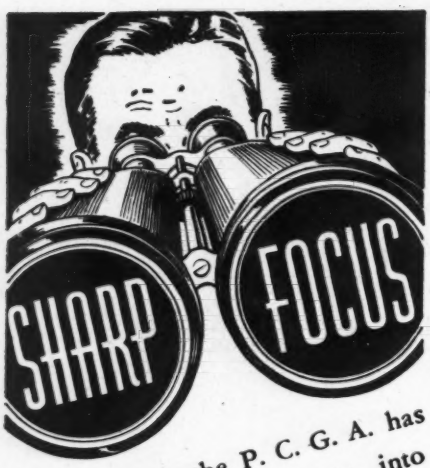
PLANTS LOCATED AT: Bayonne, N. J. • Birmingham, Ala. • Chicago, Ill. • Danville, Pa. • Houston, Texas • New Orleans, La. • Portland, Ore. • Salt Lake City, Utah • Sparrows Point, Md. • Maywood, Richmond, South Gate and Stockton, Calif.



Looking ahead, the P. C. G. A. has brought post-war problems into sharp focus. For many months, committees have worked to prepare the gas industry of the West for V-day and years to follow. ★

COMMITTEE ON APPLIANCES

Combining utility and manufacturer membership, the Post-war Appliance Committee has conducted contests and surveys that have brought out scores of ideas and suggestions. It has also sent comprehensive reports to manufacturers, suggesting lines of research for improvement of existing appliances, for the creation of new ones.

***Other* COMMITTEES ACTIVE**

The Committee on Sales Training and the Personnel Committee also have slanted their programs towards the peacetime future. ★ The keynote is . . . *planned preparedness.*

GAS FUEL

SERVING THE WEST IN WAR AND PEACE

THE PACIFIC COAST GAS ASSOCIATION

Keane Receives Meritorious Service Medal

Heroic action by Michael Keane, a fitter employed in the gas department of the Pacific Gas & Electric Co., San Francisco, was Oct. 5 recognized at the annual meeting of the American Gas Association. Mr. Keane was awarded the American Gas Association Meritorious Service Medal for having performed the most outstanding meritorious act in the gas industry during the past year. The presentation was made by President Acker.

Michael Keane

In the absence of Keane, the award was received in his behalf by R. E. Fisher, vice president in charge of public relations and sales of the P. G. & E. The heroic act for which Mr. Keane was awarded the medal is described in the citation as follows:

"On March 23, 1944, Mr. Keane, together with his foreman answered an alarm for a fire in a refinery reclaiming oil under Navy contract located in Oakland, Calif. The entire plant was a mass of flame. It was unsafe to cut the gas service at main because of flaming oil over the street. In trying to turn off the gas supply, a fireman broke the valve. Keane donned an asbestos suit and, with water playing around him, succeeded in closing the valve, thereby putting out gas burning at the base of a drum containing 4000 gal. of oil. The fire department was then able to control the fire, thus preventing its spread and probably explosion.

"Mr. Keane performed this courageous act in the line of duty, undoubtedly saving human lives and property."

The American Gas Association Meritorious Service Medal consists of a gold medal, button and certificate, and is made possible through the generosity of the late Walter R. Addicks, senior vice president of the Consolidated Gas Company of New York (now Consolidated Edison Company of New York, Inc.)

Kelly Announces SGA Committee Appointments

Frank S. Kelly, Jr., president of the Southern Gas Association has announced the appointment of a safety committee headed by James B. Harris, Arkansas Natural Gas Companies, Shreveport. Other members are: H. C. Hightower, United Gas Corp.; R. S. Huffman, Oklahoma Natural Gas Co.; and A. J. Naquin, New Orleans Public Service Inc. The committee will function as a subcommittee of the distribution committee, W. H. Ligon, Atlanta, chairman.

President Kelly also announced the formation of a coordinating committee to pass on matters affecting the Southern Gas Association, the Florida-Georgia Meters Association and the Mid-Southeastern Association. Three members of each group were appointed as follows:

Southern—H. Carl Wolf, Atlanta Gas Light Co., chairman; Frank C. Smith, Houston Natural Gas Co.; Charles B. Gamble, Birmingham Gas Co.

Florida-Georgia—Ted Bergman, Florida Power & Light Co., chairman; H. R. Cloud, Florida Public Service Co.; and A. H. Stack, Tampa Gas Co.

Mid-Southeastern—R. L. McCuen, Duke Power Co.; C. B. Zeigler, Public Service Co. of North Carolina; and J. S. Rider, Consolidated Utilities, Sumpter, S. C.

SCMA Meeting Scheduled

The next monthly meeting of the Southern California Meter Association will be held at the Rio Hondo Country Club, Downey, on Nov. 16. The papers to be presented will tell the story of natural gas from the producing field to the domestic consumer.

W. G. Cox, Southern California Gas Co. will cover the gas distribution system. His paper discusses the design, operation and maintenance of a gas distribution system and related gas measurement.

A second paper "Transmission Line Calculations" by H. R. Ross of the California State Railroad Commission will cover the sizing of transmission pipe lines, pressure requirements and measurement.

Appalachian Measurement Course to Be Resumed

At a recent meeting of the general committee of the Appalachian Gas Measurement Short Course, held at the School of Mines, West Virginia University, it was decided to resume the course which had been suspended since 1942 due to the war. The course is normally conducted by the School of Mines at the University, in cooperation with the Public Service Commission of W. Va., the W. Va. Oil and Natural Gas Association, the A. G. A. and allied industries.

At the technical sessions the following papers and reports were presented:

Designing and Installing Measuring and Regulating Stations. Report No. 3 of the Practical Methods Committee, C. B. Heist, chairman.

New Developments in Measurement of Pulsating Flow, S. R. Beitler.

Extension Program of the School of Mines, West Virginia University, for Employees of the Natural Gas Industry, George McKinley.

Gas Supply in West Virginia, H. J. Wagner.

The Operation and Testing of Large Capacity Displacement Meters in the Field, John L. Galpin and W. L. Smith.

The General Committee authorized the publication of Report No. 3, entitled "Designing and Installing Measuring and Regulating Stations," after minor changes are made. A special committee was named to investigate the subject of regulator freezing with S. R. Beitler serving as chairman. Practical Methods Committee No. 4 was established to prepare a set of convenient tables and graphs for gas men. C. A. Smith was appointed chairman of this committee.

Night and day Reliance Regulators are on the job giving dependable, efficient service. In the oil fields they perform in all types of weather and under fluctuating load demands. Oil men know they can rely on Reliance. Wherever gas is used there is a Reliance Regulator to fit that particular need. No matter what industry you are in, if you need proper gas regulation, write us for bulletins giving complete information.

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RELIANCE REGULATORS

FPC To Investigate Gas Conservation; Utilization

The Federal Power Commission has announced its order instituting investigation into:

(1) the extent and probable life of the nation's natural gas reserves;

(2) the present and probable future utilization of natural gas for domestic commercial, and industrial purposes;

(3) the extent, character, and results of the competition of natural gas with other fuels; and

(4) such related matters as may be helpful to the Commission in its administration of the Natural Gas Act or in determining what additional legislation, if any, should be recommended to Congress.

The Commission directed that a copy of the order be sent to the Governors, regulatory commissions, and conservation commissions of each of the States, to the Interstate Oil Compact Commission, to the National Association of Railroad and Utilities Commissioners, to each natural gas company, and to coal, railroad, and labor organizations and other interested parties.

FPC Permits Cities Service To Operate Hugoton Line

FPC has amended a certificate of public convenience and necessity issued to Cities Service Transportation and Chemical Co., Ponca City, Okla., to permit the Cities Service Gas Co., Bartlesville, Okla., to operate until June 30, 1954, the new 231-mile Hugoton natural gas pipeline under lease from the Transportation company. The line, which was put into operation this year, extends from the Hugoton field in Texas County to the Gas company's Blackwell station in Kay County, Okla. The order also permits the proposed financing of the facilities to become effective subject to the condition that the Transportation company does not pay to Empire Gas and Fuel Co., its parent, any interest in excess of the actual cost to Empire of securing the funds advanced or loaned the Transportation company.

Architects Manual Ready For Field Review

Work on the "Architects Manual of Modern Gas Service" (Gas. Oct., 1944, p. 88) has progressed to a point where the first draft of all sections except one on Kitchen Planning have been finished and are ready for field review prior to the final printing.

First draft copies are now in the hands of gas companies for the criticism and advice of their various interested departments.

The work of preparing this first draft has been done by small committees of individuals after which the developed material was reviewed in detail by the Subcommittee on Publicity and Specifications which is under the chairmanship of H. P. Morehouse. The major part of the detail of handling this undertaking was carried on by F. W. Williams of Headquarters Staff.

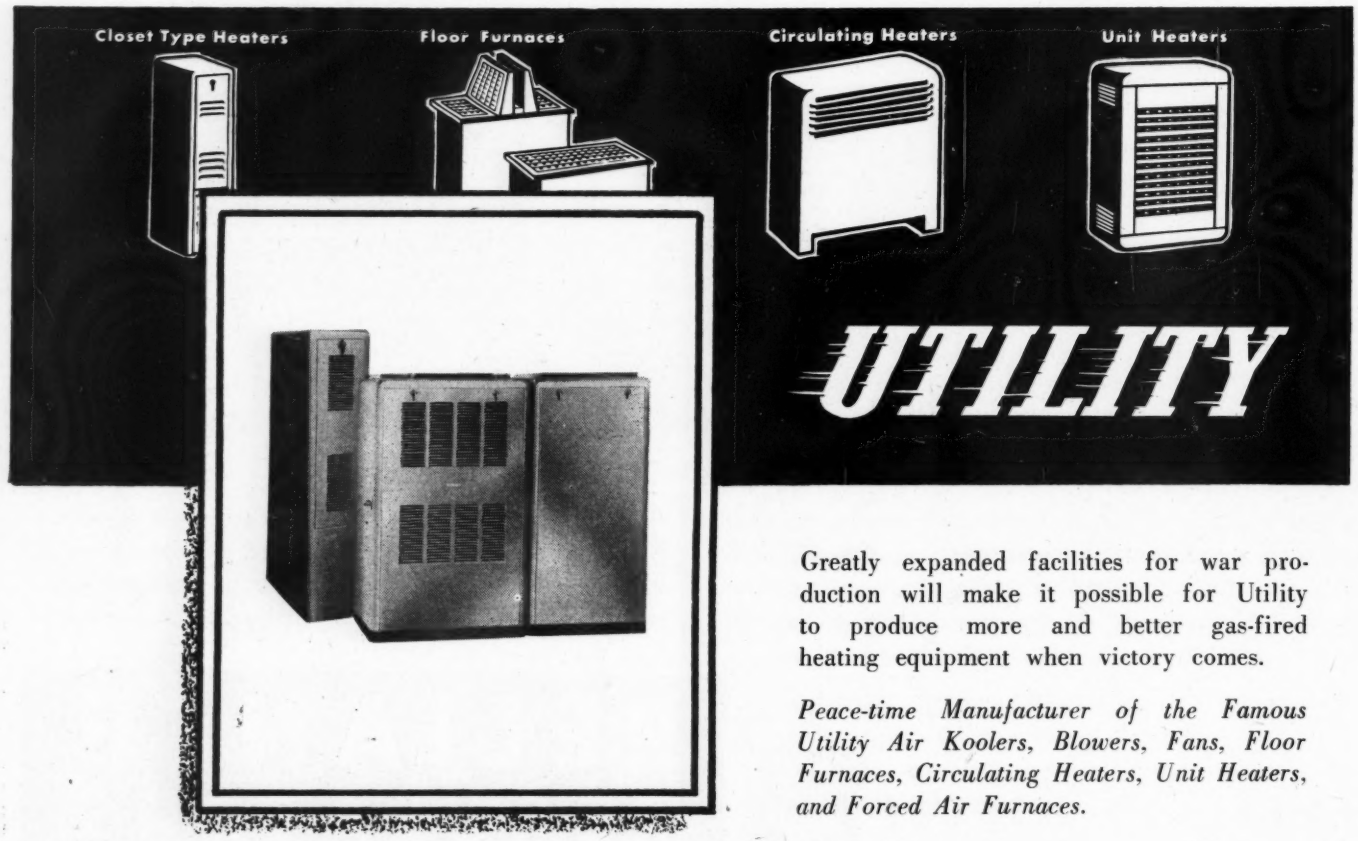
Mildred Clark Wins McCall's Better Living Award

Winners of the 1944 McCall's Magazine Awards for outstanding contribution to the advancement of better living in the home, through the promotion of gas appliances and equipment, sponsored by "McCall's Magazine" and administered through the A. G. A., were announced at the annual business meeting of the Association, October 5, in the Engineering Society's Building, New York.

Mildred Clark

First prize, a War Bond and Stamps plus an engraved plaque, was awarded to Mildred Clark, home service director of the Oklahoma Natural Gas Co. Second, third, fourth and fifth prizes, consisting of War Bonds and Stamps plus an illuminated parchment, went to Jeannette Campbell, the Minneapolis Gas Light Co.; Thelma Bly, Wisconsin Power and Light Co.; Hulda Ungericht, Ohio Fuel Gas Co.; and Mrs. Helen Heiser, Binghamton Gas Works.

Prizes were based on papers submitted by entrants, covering the aims of the home service department, in training of personnel and sales people, community activities engaged in, and increase in scope of home service activities during the year.



Greatly expanded facilities for war production will make it possible for Utility to produce more and better gas-fired heating equipment when victory comes.

Peace-time Manufacturer of the Famous Utility Air Koolers, Blowers, Fans, Floor Furnaces, Circulating Heaters, Unit Heaters, and Forced Air Furnaces.

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Proposals Drafted to Solve Supply Problem for Canadian City

A specially-formed committee of the Board of Trade in the Canadian city of Moncton, New Brunswick, has drafted a set of proposals with a view to finding a solution to the city's problem of natural gas supply.

The recommendations were made public when the committee, headed by V. E. Osborne, conferred on Sept. 11 with members of the city council and Hon. C. H. Blakeny, Minister of Federal and Municipal Relations, who represented the provincial government.

Osborne reviewed a questionaire submitted to the producing and distributing companies in which it was shown that the present rate of revenue was much too low to permit proper development of the natural gas possibilities of the Stoney Creek gas field near Moncton. He said his committee felt that the Board of Trade might well submit a resolution that would bring in more revenue to be used in development and exploratory work.

The committee's basic suggestions were three-fold: (1) that domestic rates be raised from 50 to 65c per unit and commercial and industrial rates from 40 to 55c; (2) that the city peg royalties it receives at $15,000, a sum lower by $1000 than that received last year; (3) that the provincial government forego its 5% royalties and accept a nominal sum of $100.

In discussion that followed it was suggested further that a commission be set up to guide expenditures, and that it might be more suitable to have additional money for exploratory work in the form of government grants rather than in the lessening or pegging of royalties.

It was agreed that an optimistic factor in the gas situation is the fact that only shallow areas of the gas field have been used, the boring equipment reaching only to wells at the 2000-ft. depth and that only a small percentage of the acreage had been explored.

In answer to questions regarding the New Bruswick Gas & Oil Company's work it was said that of 72 wells bored between 1934 and 1943, 40 had produced gas only, four both gas and oil, two oil only, and 26 had been without commercial value.

Gas Meters Replace Costly Machines In Testing B-29s

Latest miracle of American ingenuity in war production is the story of how precision gas meters are being used by the Hudson Motor Car Co., Detroit, to test pressure cabins in the new B-29 Superfortress bomber. The gas meters have replaced special testing machines costing several thousand dollars.

Pressure cabins caused engineering and production problems that industry never faced before. Ordinarily the expensive machine used to test the pressure cabins requires a graduate engineer to operate it and **make computations.**

Production of the huge bomber was threatened with delays when these special testing machines were not immediately available. Then one of the company engineers remembered a precision gas meter he had installed during his vacation. One was rented from the gas company and was adapted to do the testing job.

Company engineers said the meter was found accurate and simple to use with corrections made for temperature and barometric pressure. It provided important savings both in time and money.

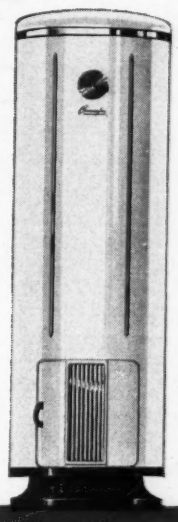
Use of the gas meter was only one of many ingenious production methods speeding manufacture of components for the army's huge long-range heavy bombers.

Two or three pressure cabins in the stratosphere bomber are included in the three large fuselage sections built by Hudson, officials stated. The pressure cabins in the B-29 enable members of the crew to fly at altitudes never thought possible before. Actual ceilings are still a military secret.

Booklet Describes Industry Research Projects

A new booklet entitled "Research Projects of the American Gas Association 1944" has just been issued by the coordinating committee on research, E. P. Noppel, chairman. The booklet describes cooperative undertakings sponsored on behalf of the gas industry.

The majority of cooperative research goes on at the Cleveland Laboratories and the Gas Institute in Chicago. Other projects are conducted at selected laboratories.



This book reveals the INSIDE story about SMITHway *Permaglas* Automatic Gas Water Heaters. It tells the complete facts about *Permaglas*... the permanently fused blue glass lining that keeps SMITHway Water Heaters always free from rust... always sanitary... long enduring! It is a profit-builder... a good-will creator... a source of information about the outstanding quality advantages available only in SMITHway Water Heaters. Prepare now for sales by getting this interesting book!

Have You Bought an Extra War Bond This Month?

SMITHway Permaglas GLASS LINED GAS WATER HEATERS

"Heated with Gas... Stored in Glass"

MAIL THIS COUPON TODAY!

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I'd like to get the "inside story" of *Permaglas!* Please send me a copy.
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PIPELINE NEWS

• **Cities Service Gas Co.**, Bartlesville, Okla., has applied to FPC for authority to construct and operate:

1. Fifty-two miles of 16-in. pipeline from present facilities in the Burbank field near Shidler, Osage County, Okla., to the company's Cotton Valley measuring station, Washington Couny, Okla.
2. About 6½ miles of 16-in. pipeline between the Altoona 16-in. line and the Vilas 16-in. line in Wilson County, Kans.
3. A water system and two dust scrubbers at the Graham compressing station, Montgomery County, Kans., and two dust scrubbers at the Perolia compressing sation, Allen County, Kans.

• **Empire Gas and Fuel Co.**, a Pennsylvania corporation with principal offices at Wellsville, N. Y., has applied to FPC for authority to acquire and operate about 8 miles of 8-in. pipeline in northern Pennsylvania. The line, to be bought from Empire Producing Corp., extends from a connection with the N. Y. State Natural Gas Corp.'s pipeline in Hebron Township, Pa., to Empire's 6-in. line at Holmes Junction, Potter County, Pa.

FIELD MEASUREMENTS
of Specific Gravity of Gas With
LABORATORY ACCURACY
Precision Built in Arcco Laboratories
Ruggedly constructed. Completely self-contained. No accessories required.
ARCCO-ANUBIS Portable GAS BALANCE
LIGHT
Only 20 pounds complete in carrying case.
NO TINKERING
Easy to operate and easy to read. STAYS accurate in hardest field service.
Hundreds in use by major companies.
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SEND FOR COMPLETE LIST OF ARCCO CHARTS

• **Southern Natural Gas Co.**, Birmingham, has applied to FPC for permission to expand its present pipeline facilities as follows: (1) to construct and operate loop lines from 10 to 22 in. and from 687 ft. to about 27 miles in length, in Perry, Dallas and Jefferson counties, Ala.; Issaquena County, Miss., and Fulton and Bibb counties; (2) lines, heaters and meters in the Logansport, La., gas field, and miscellaneous compressor station and pipeline equipment; (3) 5 miles of 4-in. line near Spaulding, Ala.; (4) 7 air-cooled mufflers on seven 1300-hp. gas compressors at the Perryville, La., compressor station, and two gas scrubbers at the Logansport dehydration plant.

• The **Oklahoma Natural Gas Co.**, Tulsa, Okla., has ordered material for construction of 11 miles of 8-in. gas pipeline extending from the Peppers Refining Co., gasoline plant in the West Edmond Oil field to a connection with its transmission system on May Ave., at Oklahoma City.

The line will utilize separator gas from the Peppers plant. Deliveries of pipe are expected to begin in September and the line is scheduled for completion within two months from receiving the first materials.

• Natural gas for Wisconsin took a set-back Oct. 12 when the Federal Power Commission dismissed applications by Wisconsin Southern Gas Co., which sought authority to connect with the Natural Gas Pipeline of America system to bring gas through a 4½-in. line to be constructed to Lake Geneva, Wis. The city of Burlington, largest of the communities served by Wisconsin Southern, had not authorized the proposed changeover from manufactured to natural gas.

• FPC has authorized **Kansas-Nebraska Natural Gas Co.**, Inc., Phillipsburg, Kans., to construct and operate about 16 miles of 12¾-in. pipeline extending north from the Stockton compressor station in Rooks County, Kans., to replace an equal length of existing 6⅝-in. line, construction of the facilities to be completed before the end of the year.

• The world's biggest oil pipeline, the 1363-mile **"Big Inch"** from Longview, Texas, to the New York-Philadelphia area, began its second year of full-length operations Aug. 14, having delivered 96,292,000 barrels of crude oil from the Texas fields to eastern refineries during the last 12 months.

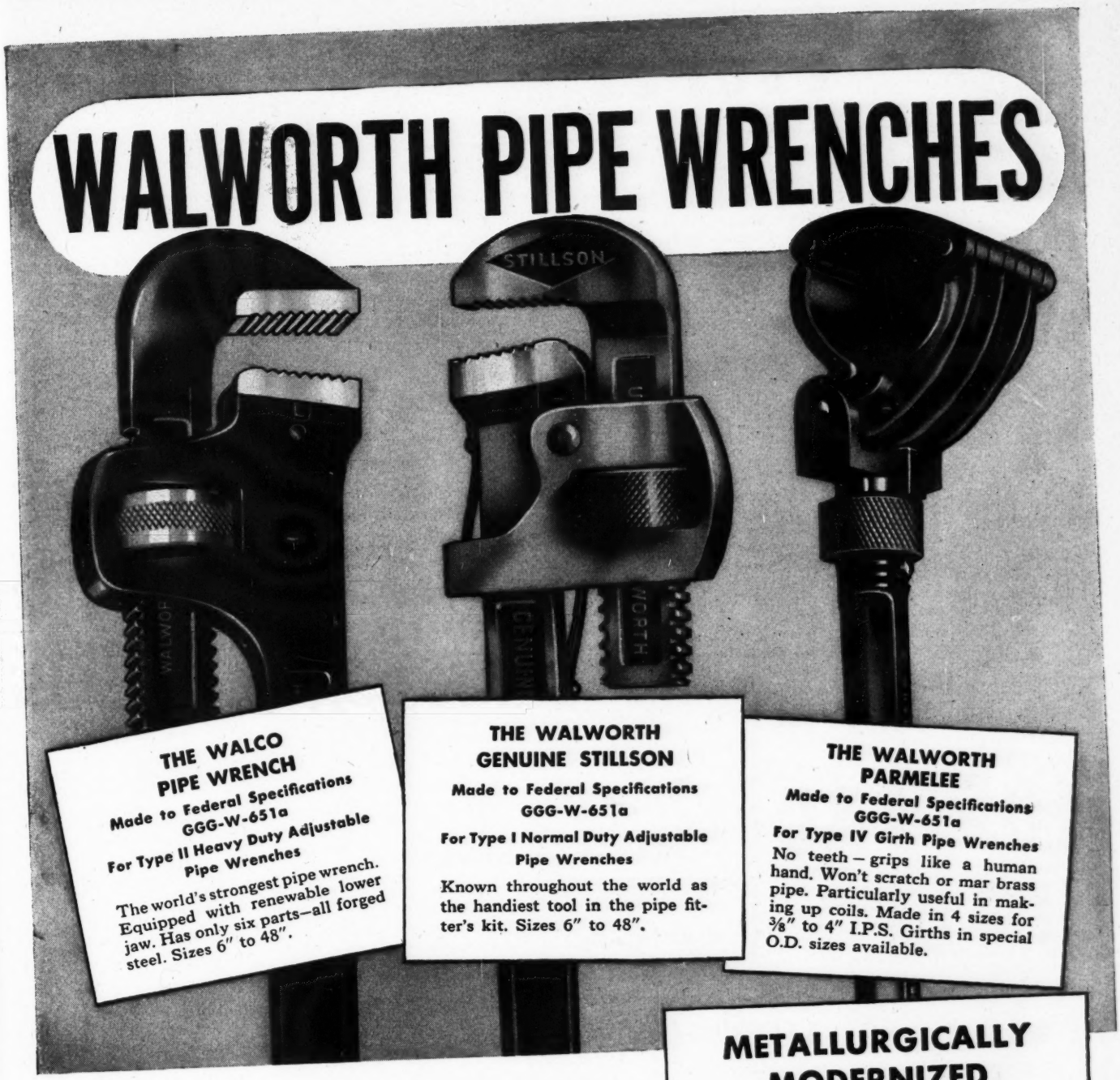
Southern California Co. To Build New Holder

Southern California Gas Co. has begun construction on a new 500,000 cu. ft. high pressure gas storage holder at Visalia, it is learned from San Joaquin Valley Division Manager George A. Porter.

The structure, made of 1-in. steel, will be 65 ft. in diameter. The holder itself will require 360 tons of steel, while into the foundation will go 80 yards of concrete and seven additional tons of steel.

The installation is being made to take care of peak hour demands occasioned by the steady growth of the gas load in the division.

WALWORTH PIPE WRENCHES



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Made to Federal Specifications GGG-W-651a

For Type II Heavy Duty Adjustable Pipe Wrenches

The world's strongest pipe wrench. Equipped with renewable lower jaw. Has only six parts—all forged steel. Sizes 6" to 48".

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Known throughout the world as the handiest tool in the pipe fitter's kit. Sizes 6" to 48".

THE WALWORTH PARMELEE

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For Type IV Girth Pipe Wrenches

No teeth – grips like a human hand. Won't scratch or mar brass pipe. Particularly useful in making up coils. Made in 4 sizes for ⅜" to 4" I.P.S. Girths in special O.D. sizes available.

These three types of pipe wrenches are manufactured by the Walworth Company, and are noted for their safety, strength, and simplicity of operation.

Walworth, with more than a century of "know-how," also manufactures a complete line of valves, fittings, and pipe. For details see your Walworth distributor, or write on your company letterhead for free copy of Catalog 42.

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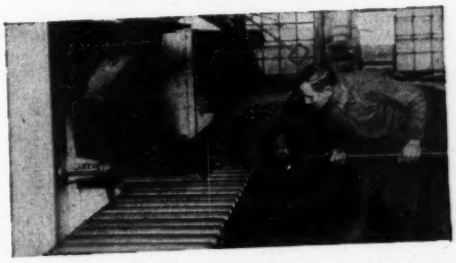

The most advanced metallurgical procedures are employed in the manufacture of Walworth Pipe Wrenches. Forging, heat-treating, and machining operations are performed with modern production equipment under strict supervision. In this way Walworth maintains the high standards of quality that have made Walworth pipe wrenches famous throughout the world.

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PEOPLE

E. Holley Poe, former executive vice president of Petroleum Reserves Corporation, Washington, D. C., has opened offices at 70 Pine Street, New York City, with branches at 231 South La Salle Street, Chicago and 306 National Savings Trust Bldg., Washington. **H. C. Orton** is in charge of the Chicago office and **Samuel H. Crosby** heads the office in Washington.

E. H. Poe

Poe, his associates and staff, are engaged in consulting and advisory work concerning all phases of gas utility operation.

A native of Oklahoma, Poe grew up in the oil and gas industries and has been associated with various oil and gas companies throughout most of his business career.

In 1937 he was selected to head the Natural Gas Section of the American Gas Association. On June 1, 1942 he was called to Washington to become director of the Natural Gas and Natural Gasoline Division, Petroleum Administration for War, and remained in this position until October 1943 when he took over the executive direction of Petroleum Reserves Corporation at the personal request of Secretary Ickes. His work with that corporation was successfully completed in March 1944.

• **Franklin H. Nickerson,** vice president and trustee of Consolidated Edison Co. of New York, Inc., retired in September, thus ending a 47-year association with the company.

Starting as a clerk, he gradually worked into various executive positions in the accounting, statistical and financial departments. He was appointed vice president in charge of finance and statistics of the Consolidated Gas Co. in 1929, and since the 1936 mergers had served as vice president for regulatory, statistical, tax and related matters.

• **C. W. Strance** has been appointed chief supervisor for the oil and gas division of the Texas Railroad Commission, according to announcement by **Beauford Jester.** He was promoted from head of the Houston office of the Commission. He had previously served with the Coleman Oil & Gas Co. and for Lone Star Gas Co. as a scout, paleontologist, public relations man and supervisor of well drilling.

• **Robert Brinton Harper,** vice president, The Peoples Gas Light and Coke Co., Chicago, has received the 1944 Honor Scroll award presented yearly by the American Institute of Chemists to some outstanding member of the chemical profession. The award was made in recognition of his distinguished service to the gas and allied industries as organizer executive and scientist.

R. B. Harper

Mr. Harper joined the company in 1905 as assistant chemist in the five-man laboratory, a year later becoming its head, and today directs the operation of eight research and testing departments. He played a leading part in the establishment of the A. G. A. Testing Laboratories, and also helped in founding the Institute of Gas Technology.

He received the Beal Medal Award, for the most outstanding technical paper presented to the A.G.A. in 1931, in 1933 was elected a Fellow of the American Association for the Advancement of Science, and in 1936 became a Fellow of the American Institute of Chemists. In 1938, he also received the Walton Clark Gold Medal of The Franklin Institute of Philadelphia, as an award in recognition of "his leading part in the development, supervision and direction of a research and testing laboratory of outstanding excellence in the gas industry."

• **H. Carl Wolf,** chairman of the American Gas Association's committee on national advertising, has announced the following changes in the sub-committee on approval of domestic gas copy:

• **J. J. Quinn,** sales manager of Boston Consolidated Gas Co., and New England representative on the committee on national advertising, has been elected chairman to succeed **W. M. Jacobs,** manager of general sales, Southern California Gas Co., Los Angeles, who was forced to resign because of travel difficulties. Jacobs will continue as a committee member.

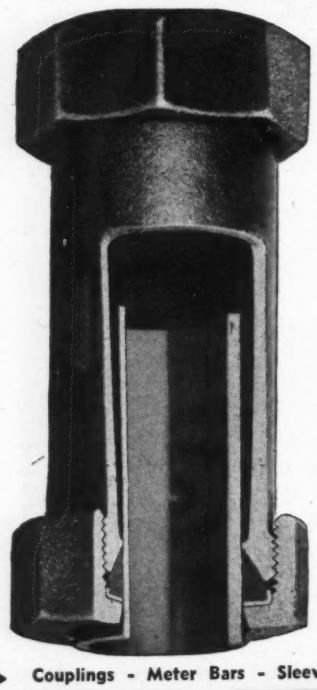
Henry Obermeyer, assistant vice-president, Consolidated Edison Co. of New York, rejoins the sub-committee on approval of domestic gas copy, as well as the national advertising committee of the Association's industrial and commercial gas section.

• **James F. Pollard,** former president of Seattle Gas Co., Seattle, Wash., has joined Pacific Gas and Electric Co., San Francisco, in the executive engineer's department.

Mr. Pollard won the Charles A. Munroe Award in 1939 for his leadership in starting the gas industry's national advertising campaign. His forceful and intelligent presentation of the need for national gas advertising at the 1935 A. G. A. convention in Chicago, which brought about the creation of a committee charged by the Executive Board to raise funds, caused him to be known as the "father of national gas advertising."

NORMAC

COUPLINGS, SLEEVES AND FITTINGS



for maximum deflection, ease of "stabbing," complete confinement of the rubber!

So close are "Normac" rubbers confined at the gasket tip that possibility of flow is reduced almost to "nil." These couplings, sleeves and fittings . . . approved by gas utility men across the country for their time-saving features, ease of handling and dependable service . . . are available in a complete range of sizes. Made from air furnace malleable iron they provide greater wall thickness than pipe on which used.

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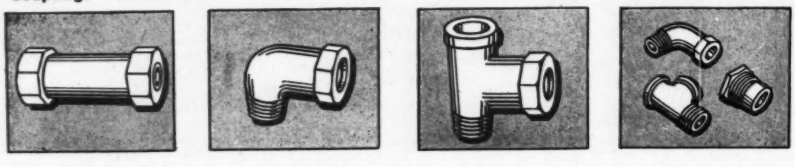

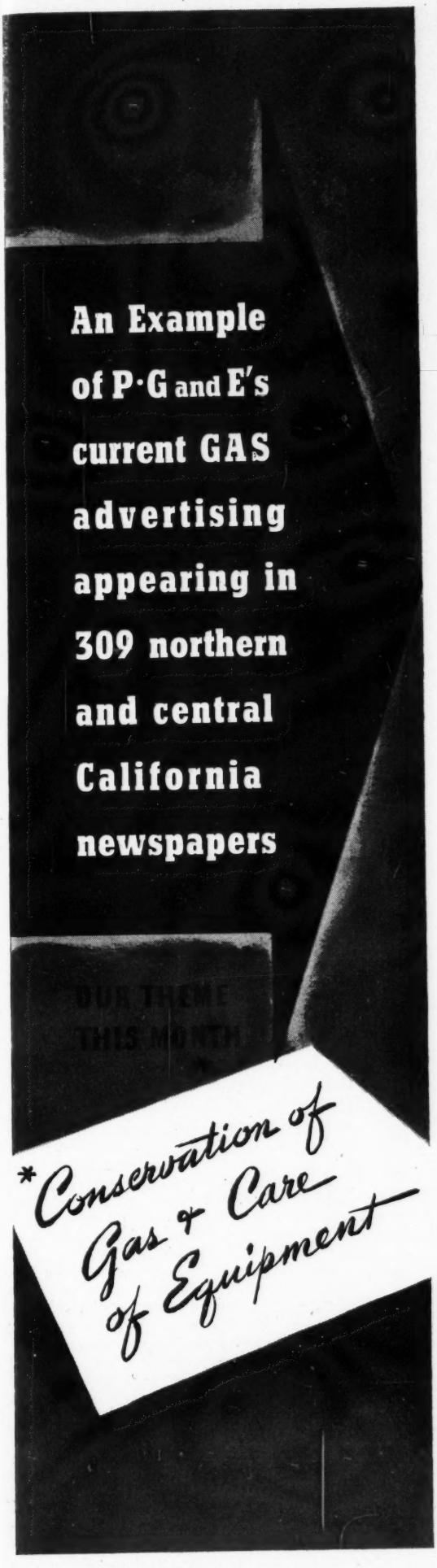
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if you use me right
Your water heater is tough and built to take it, but it will last longer if not abused.
Keep your tank free of sediment and rust. Clear the tank about once a month. It is easy to do. Here is how There is a drain faucet near the bottom of your automatic storage water heater. Attach a hose to this drain faucet. Turn on faucet and let water run into floor drain or laundry tubs or a bucket. Run off tank water until it runs clear. It is not necessary to shut off any valves such as incoming water, gas burner or pilot light.
Make sure that the thermostat on your water heater gets no higher than 140 degrees.
. . . Your heater requires but little attention . . .
Of course, these days, you want to conserve gas . . . to be used in industries where it is needed most. Yet you want enough hot water on tap for your family requirements.
Both are possible if you avoid waste. For example, a faucet dripping only 90 drops a minute will waste 10 family-size tanks of hot water in a month . . . and careless use will waste even more. To prolong the life of your heater, follow manufacturer's directions regarding thermostat and pilot light.
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N. T. Sellman

• **Nils T. Sellman** has been elected a vice president of the Westchester Lighting Co. and The Yonkers Electric Light and Power Co., N. Y., and has also been elected to the executive committee of the Westchester Lighting Co. and to the Board of Directors of the Yonkers Co. As assistant vice president of Consolidated Edison Co. of New York, Inc., he has been in charge of electric and gas sales in New York City since 1942.

Immediately after graduating from Stevens Institute of Technology in 1913, he became a test engineer for Consolidated Gas Co. In 1921 he joined the A. G. A., later becoming assistant secretary manager. In 1925 he returned to Consolidated Gas Co. as engineer of utilization and in 1928 was appointed assistant secretary of the company. Since the mergers of the gas and electric companies into the Consolidated Edison Co. in 1936, he has been assistant vice president in charge of sales.

• **Gray A. Strain,** vice president, recently retired from the New York State Electric & Gas Corp., Ithaca, N. Y., bringing to a close 38 years of service with the company.

Mr. Strain began as a boiler inspector in the Detroit City Gas Co.'s plant in 1894, working on the construction and operation of manufactured and natural gas plants and distribution systems for the company. In 1906 he joined J. G. White Management Corp., predecessor of the Associated Gas & Electric Co., as superintendent of the plant at Helena, Mont., and served there until 1918 when he transferred to Ithaca as general superintendent of the New York State Gas & Electric Corp., where he directed gas and electric operations in Ithaca, Cortland, Oneonta, Norwich and Liberty.

• **Hudson R. Searing,** executive vice-president, Consolidated Edison Co., N. Y., has announced that Lt.-Col. **Atherton Thomas** has been appointed assistant personnel director, assigned to the task of fitting Consolidated Edison employees discharged from military service into jobs with special consideration of their experience, new skills and knowledge gained during the war. Col. Thomas will be released from the Army so that he can begin his work by Nov. 1.

• **A. Clarke Bedford,** general sales manager, has been elected executive vice president of Standard Oil Co. of New Jersey. He had previously been assistant sales manager, as well as a member of the marketing committee of the company. Prior to joining Standard Oil he had served Carter Oil Co. as secretary and assistant treasurer, and had been engaged in refining, accounting, and production work for various company interests, including the presidency of Colonial Beacon Oil Co., Boston.

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M. B. SKINNER CO. SOUTH BEND, IND.
CLAMPS AND SADDLES FOR CAST IRON AND STEEL PIPE. STANDARD OF THE WORLD FOR NEARLY HALF A CENTURY

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40 RECTOR STREET, NEW YORK, N. Y.

• Southern California Gas Co. has established a "publications department" with **Otto C. Mauthe,** previously special representative, to be known as manager of publications while his assistant **J. T. Van Rensselaer** will assume the title of editor of publications.

O. C. Mauthe

The new department has been inaugurated in recognition of the "increasing importance of the bi-weekly paper and the illustrated supplemet" published by the department.

Effective September 25, **Warren Clutterbuck,** who recently completed a tour of duty in the Army Air Corps, joins the staff as field representative. Formerly employed by Southern Counties Gas Co. he is well known by people in both companies. His new duties will include the securing of material for company publications.

• **Harry S. Elder** has been appointed assistant purchasing agent of the Arkansas Natural Gas Co., according to an announcement by **D. W. Harris,** vice president and general manager of the Arkansas Natural Corp., Shreveport, La. He replaces **Hugh Gallagher,** now in military service.

Elder joined the company in 1929 in the purchasing department. In 1941 he was assigned the handling of WPB regulations and all priority work, remaining in that capacity until his present promotion. He will continue to supervise this work in addition to his new duties as assistant to **Dave Cowden,** service department head.

Another appointment announced by Mr. Harris was that of **Willad Gibbons** as chief clerk of the Shreveport district, Arkansas Louisiana Gas Co. He replaces **H. J. Adams,** resigned.

Originally a member of the Southwestern Gas and Electric Co., he joined Arkansas Louisiana Gas Co. 14 years ago, as cashier in the gas distribution department. In 1936 he was transferred to Texarkana as chief clerk, and in 1941 returned to Shreveport as supervisor of all company offices, where he served until he assumed his new position.

• Petroleum Administrator for War **Harold L. Ickes** has announced the appointment of **B. Brewster Jennings,** of New York City, to membership on the Petroleum Industry War Council. He will fill the vacancy created by the recent death of John A. Brown, president of the Socony-Vacuum Oil Co.

Mr. Jennings began his career in 1920, after graduation from Yale University, as a clerk in the marine department of the Standard Oil Co. of New York (Predecessor of the present organization). Later, he held the position of purchasing agent and manager of real estate.

• **Henry V. Lindeman,** principal engineer for the manufactured gas division, OWU, has joined the Jacksonville Gas Corp., Jacksonville, Fla., as engineer. Prior to his association with WPB, he was commercial sales engineer for Metropolitan Edison Co., Easton, Pa.

• **D. W. Harris,** Shreveport, La., was elected president of the Arkansas Natural Gas Corp. Oct. 20 at the annual meeting of directors in New York.

P. W. Harris

Harris has served as vice president and general manager of the company and its subsidiaries, Arkansas Fuel Oil Co., Arkansas Louisiana Gas Co., and Arkansas Pipeline Co., since 1928.

Under Harris's management the company has had a steady growth and is one of the leading oil and natural gas properties in the South. It pioneered in the discovery and development of the vast East Texas oil field and the Rodessa, Sligo, Lincoln Parish, Louisiana fields.

In the new Carthage, Texas field, which the industry expects to be one of the largest natural gas fields in the world, the company has 22,000 acres of proven and potential holdings. Extensive acreage in the best oil and gas areas of Mississippi and Alabama are also held by the company.

• Appointment of **Walter E. Caine** as chief statistician of the American Gas Association has been announced by Ernest R. Acker, president. He comes from the Federal Power Commission where he was assistant chief of the division of rates and research.

W. E. Caine

In his new post Caine will direct all activities of the statistical department, which will mean compiling national gas industry statistics for both the natural and manufactured gas branches of the industry, and directing an enlarged program of statistical analysis and market research.

From October 1942 until September 1944, when he joined the American Gas Association's staff, he devoted full time to supervision of FPC's war power contract program.

• **T. M. Chubb** has been appointed chief gas engineer and assistant secretary of Pacific Lighting Corp. with headquarters in Los Angeles, according to an announcement by **LeRoy M. Edwards,** vice president and general manager of the company.

Chubb has been associated with the Office of War Utilities, Natural Gas Division, in Washington, D. C., as Western Area Chief for almost two years. For six years prior to that time, he was senior engineer of the California Railroad Commission, Gas and Electric Division.

• **Leland Olds** took oath of office as a member of the Federal Power Commission on September 15 for a term expiring June 22, 1949, and **Basil Manly** was elected chairman of the Commission for a term expiring June 22, 1948.

• **James B. Black,** president, Pacific Gas and Electric Co., San Francisco, Calif., was recently elected a director of U. S. Steel Corp., N. Y., at the regular monthly meeting of the board it is announced by **Irving S. Olds,** chairman. Mr. Black succeeds the late **William J. Filbert.**

A graduate of the University of California in 1912, his business career has been concentrated in California, with the exception of nine years when he served as president of the North American Co. in New York. His election makes him the first Pacific coast director of the corporation.

Mr. Black is also a director and member of the executive committee of the Southern Pacific Co., a director of the Equitable Life Assurance Society, Fireman's Fund Insurance Co., Del Monte Properties Co., and California Pacific Title Insurance Co.

• **Honoria B. Moomaw** has resigned as secretary of the natural gas department of the American Gas Association effective October 1. She has accepted a position in the natural gas consulting organization of **E. Holley Poe** in New York.

Miss Moomaw has been secretary of the natural gas department since June 15, 1942. Prior to that time, for a number of years she was secretary to Mr. Poe when he was associated with the A. G. A. as executive secretary of its natural gas activities.

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RECOGNIZED QUALITY!

For over half a century, Western home-makers have been depending on the superior performance guaranteed by the name WEDGEWOOD on their gas ranges. From ordinary housewives to master chefs—anyone who cooks with gas recognizes in WEDGEWOOD a faithful friend.

Model 5023A BK, with incinerator, cooks your food, heats your room, burns your trash. Model 5186A, without incinerator, is also available now.

The James Graham Manufacturing Company is still largely engaged in essential war production, in addition to manufacturing famous WEDGEWOOD Gas Ranges. But service to WEDGEWOOD dealers continues to flow without interruption.

WEDGEWOOD MAKES NEW FRIENDS FOR GAS

WEDGEWOOD THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO.
Los Angeles • San Francisco • Newark, Calif. • Portland, Oregon

Manufacturers

• Announcement of the promotion of **J. E. Brown,** veteran sales executive of Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co., to the position of assistant to the general sales manager was made recently by **A. J. Kerr,** general sales manager. Mr. Brown will maintain offices at the company Pittsburgh headquarters.

He joined the Pittsburgh Meter Co. in 1906, and upon consolidation of that firm with the Equitable Meter Co., in 1926, he was made manager of the Chicago district office, but returned to Pittsburgh the following year as Director of Sales for the company. In 1942 the home office Sales Order Department was placed under his jurisdiction.

• **Malcolm Muir,** president and publisher, and **Theodore F. Mueller,** vice president and general manager, of "Newsweek," announce the appointment on Oct. 15 of **Arthur P. Hirose** as director of promotion and research.

Hirose is resigning as director of promotion and market research, McCall Corp., publishers of "McCall's" and "Redbook" Magazines, having been connected with the McCall organization for the past 10 years. He is a member of the promotion advisory committee of the Magazine Advertising Bureau, and the marketing committee of C. E. D. and is research co-ordinator of the War Advertising Council.

Prior to his work for the McCall Corporation, he was manager of the sales promotion and market analysis departments of a group of McGraw-Hill publications.

• Latest addition to the executive staff of Hammel Radiator Engineering Co., Los Angeles manufacturers of gas heating equipment, is **Fay Suffron,** former member of the research staff of **A. G. A.** Mr. Suffron's appointment rounds out the development of the Hammel organiation, which has recently been extended by the appointment of **L. M. Hull** as sales manager. It marks another step in carrying out the postwar expansion plans of the company.

Mr. Suffron joins the organization as research engineer. Graduated in civil engineering from Oregon State College, he is well known in the gas industry. He formerly served with the Portland Gas and Coke Co. at Portland, Oregon and the Washington Gas and Electric Co. at Tacoma. For 10 years he was on the staff of the A. G. A. Testing Laboratories, first at Cleveland, Ohio and later at Los Angeles where he acted as Supervisor of the Association's Testing Laboratory. Much of the domestic gas research now being reported by the Laboratory was initiated under his supervision.

In 1942 The Hammel Radiator Engineering Co. took over the plant and manufacturing business of the Hammel Radiator Corp., of which **A. S. Martinson** was vice president and general manager.

Mr. Martinson now announces the purchase of the interests formerly owned in the company by **Mr. S. D. Crozier.** Following this change, six of the key men in the organization purchased an interest in the business—joining Mr. Martinson in the company. The new associates are: **L. M. Hull,** sales manager; R. A. Martinson, purchasing agent; **R. E. Washburn,** development engineer; F. O. Suffron, research engineer; **L. K. Silvrants,** day superintendent and **W. N. Ensley,** night superintendent.

A. S. Martinson, F. O. Suffron, L. M. Hull, associates in Hammel Radiator Engineering

• Appointment of **D. S. Whamond** as eastern district sales manager of the A. O. Smith Corp. home appliance division has been announced by **J. E. Woodall,** home appliance manager at the firm's general offices in Milwaukee.

Whamond assumed his new duties Oct. 2. His headquarters will be in the New York district office, 2500 Commercial Bldg., 155 East 44th Street, under supervision of **Russell J. Irish,** eastern executive administrator.

Until recently Whamond was home appliance manager of the Bastian-Morley Co., Inc., La Porte, Ind., and previously was general manager of the Arrow Oil Burner Co., Inc., of Oak Park, Ill.

• **C. B. Wilson** has been appointed sales manager and buyer of The Holcomb Gunn Co., Little Rock, Ark., according to a recent announcement. Mr. Wilson was formerly associated with the Henry L. Doherty organization, and had served as junior engineer with Empire Gas & Fuel Co., Bartlesville, Okla., house-heating and commercial sales engineer for Cities Service affiliates, purchasing executive for Western Electric Co., Atlanta, and new business manager of the Arkansas Division, Arkansas-Louisiana Gas Co. He is also a past president of the Southern Gas Association.

• **Jessica B. Taylor,** formerly with the Southern California Gas Co., is now affiliated with Ward Heater Co., in the engineering division. Postwar, she will be active in sales. In 1926 she organized the gas appliance exhibit for the L. A. Gas and Electric Corp., and was supervisor of appliance counselors until 1938, when she became associated with the Natural Gas Bureau through Southern California Gas Co.

IT'S LIKE *writing* A LETTER HOME

These ads month after month . . . telling you that all of our production is going to war . . . are simply to remind you that the name to remember when you want real snap-acting gas controls after the war is

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The Mettler "FAN-AIR" Gas Burner *is*

A FULLY AUTOMATIC "MECHANICAL DRAFT" GAS BURNER SYSTEM IDEAL FOR SCOTCH MARINE BOILERS—*Prompt Shipments*

Mettler Entrained Combustion Gas Burners

FOR ALL Purposes Kinds of gas Pressures

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JANUARY 2nd, 1923
MAY 26th, 1925
NOV. 4th, 1926

LEE B. METTLER CO.

406 S. Main St. Los Angeles, Cal.

• Consolidation of the Columbia, S. C., and Atlanta, Ga., offices of Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co. was announced recently by **A. J. Kerr,** general sales manager coincident to the retirement of **F. G. Swaffield,** district manager of the firm's Columbia office.

F. G. Swaffield

Mr. Swaffield's retirement ends his 40-year career with the sales force of Pittsburgh Equitable-Merco Nordstrom. Joining the company in 1904 as a salesman, and later appointed district manager of the Columbia office, he has been largely responsible for the wide current use of the company's products in the Columbia territory.

In assuming control of this territory, **C. C. Moore,** manager of the Atlanta district office, now directs field sales in the entire southeast section of the U. S., including Florida, Georgia, Alabama, Mississippi, Tennessee, North and South Carolina, Virginia and most of Kentucky.

• **Donald E. West** has been named director of market research, according to **Phillips Wyman,** vice president and director of publication selling of the McCall Corp. N. Y., publishers of McCall's Redbook and other magazines. He succeeds **Arthur P. Hirose.**

• **A. S. Hess,** formerly assistant to **Harry Holbrook,** administrator of Orders L-182 and L-23, plumbing and heating branch, W. P. B., has joined the Detroit-Michigan Stove Co. and will represent that company as New York sales representative for Garland commercial cooking equipment. Prior to his position with WPB, Mr. Hess for several years represented commercial cooking equipment manufacturers in the East.

• **T. T. Arden,** president of the Grayson Heat Control, Ltd., Lynwood, Calif., announces the following changes in its sales staff: **J. E. O'Hagan** has been promoted to vice president and factory manager. **Hal Singleton** has been promoted to sales manager and **J. H. Lewis** is now assistant sales manager.

The Grayson Heat Control, Ltd., is a division of the Robertshaw Thermostat Co., with main offices at Youngwood, Pa.

Obituaries

• **Carl Clifton Kizer,** 58, assistant treasurer, Lone Star Gas Co., died in Dallas, Tex., September 14. Mr. Kizer joined the old Dallas Gas Co. in 1907. In 1920 he became treasurer and in 1943, when Dallas Gas became the Dallas division of Lone Star, he was named assistant treasurer of the organization.

• **Earl R. Ernsberg,** 67, retired president of Southwestern Power and Light Co., Oklahoma City, Okla., died at his home recently. He had been an Oklahoma utilities and railroad official for many years.

• **Daniel H. Perkins,** 50, superintendent of the gas department of the San Diego Gas & Electric Co. since 1923 and widely known on the west coast for his technical research work in the Pacific Coast Gas Association, of which he was a director, died October 4, following several months' illness.

A native of Fremont county, Iowa, Perkins had completed 30 years of service with the San Diego utility whose employment he entered as a clerk in 1914, a year after his arrival in San Diego. He served in World War I as a lieutenant and upon his return to the company he rose to the rank of foreman in the gas distribution department in 1920; to the rank of inspector in 1921; assistant superintendent in 1922, and finally full superintendent on October 23, 1923.

Perkins was very active in Pacific Coast Gas Association work and as chairman of the technical section of that organization, he directed research work in gas regulators, pipe corrosion and the manufacture of high BTU manufactured gas.

• **Malcolm M. Eckhardt,** 66, former president and general manager of Derby Gas and Electric Co., Derby, Conn., died September 13 after a long illness. He became affiliated with the company in 1925, and in 1934 was made secretary-treasurer, succeeding to the presidency later in the year. Ill health had forced him to retire in 1942.

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READY for production the moment materials are released—That's the status of the new line of Hammel Gas Heating Equipment. This line is complete; it covers the residential, commercial and industrial fields.
National distribution is the aim of Hammel. The organization is built and *ready* to go. Get the facts now! Write for full information.

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Domestic Gas Research Bulletins Issued

DISTRIBUTION of five newly published bulletins places before the industry latest published results of the accelerated research program sponsored by the Committee on Domestic Gas Research. Three of these new bulletins are devoted to gas cooking research, one deals with gas water heating and the fifth with a study of non-aerated burners. They bring to eleven the total number of research publications dealing with domestic gas research issued during the 1943-44 Association year.

Representing the seventh publication devoted to domestic gas cooking research, Bulletin No. 27 is entitled "A Study of Performance Characteristics of Vented Domestic Ranges." It gives extensive consideration to effects of chimney drafts on performance of top, oven and broiler burners of various types of ranges. Special attention is devoted to those of flush-to-the-wall design. From data obtained two methods of venting are discussed which provide satisfactory performance of all burners under extreme draft conditions. A basis of design of draft diverters is set forth embodying principles resulting from this study.

Bulletin No. 28 "Electric Ignition of Gases" presents new and valuable data on a subject not previously covered in published form. Devoted mainly to igniters of the hot wire coil type a complete analysis is made of various factors involved in providing satisfactory ignition with particular respect to coil temperature and time required. Anticipated life of different types of such igniters under various operating conditions is evaluated, including factors of design of the lighting coils. A short discussion on the use of high voltage electric sparks for ignition of gas is also presented.

Bulletin No. 29 "Principles of Design and Sizing of Automatic Gas Water Heaters for Maximum Service Efficiency" is the fourth in the series of domestic gas water heating publications. Results of extensive studies are presented on the sizing of automatic storage heaters for maximum efficiency in service. One series of recommended sizes is offered, designed to furnish unlimited hot water service where flexibility is more important than operating cost. A second covers the slow recovery type of service where cost of operation is of greater importance than an unlimited hot water supply.

Possibilities of improving operating efficiency by use of flue gas and hot water heat traps, elimination of metal-to-metal contacts, insulation of storage vessel bottoms, and two-stage heating, and other factors are evaluated. A review of existing data on determining hot water needs and a summary of previous research on factors affecting service efficiency are also presented in an Appendix.

"Non-Aerated Burners", as Bulletin No. 32 is titled, gives extensive data on conditions under which luminous or non-luminous flames are obtained with burners of this type. Non-aerated burners have been employed to a limited extent for special applications and in recent years considerable interest has been exhibited in their use with domestic equipment. The study covers fundamentals underlying the combustion of different gases without primary air and sets forth basic principles which will be helpful in design and utilization of burners employing this feature. Advantages and disadvantages which they offer are also discussed.

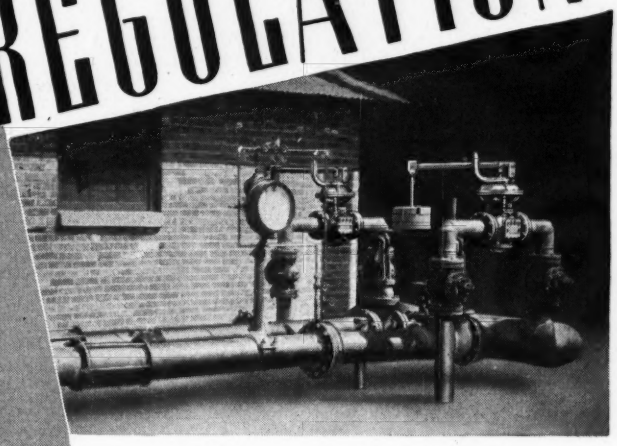
Issued as the ninth publication in the gas cooking series, Bulletin No. 33 "Design Features Affecting Gas Range Surface Temperatures" is devoted to effective insulation of ovens and broilers. Extensive new data are presented on heat losses through doors due to metal-to-metal contacts and leakage of flue gases. Substantial reductions in such losses are shown to be possible by suitable constructional features with resultant lowering of surface temperatures of exposed range parts. Additional information on this subject of much value to designers is also supplied by inclusion of data summarized from previous publications.

Gas Injection Increases Appalachian Oil Recovery

Practical and expedient air-and-gas injection methods for increasing oil production rates from partly depleted pools of the Appalachian fields are proving successful as a wartime measure to help ease the burden on the nation's major flush petroleum fields, Dr. R. R. Sayers, Director of the U. S. Bureau of Mines, reveals in releasing an informative report written by bureau engineers in that area.

Because the discovery rate of new fields has not kept pace with the unprecedented demands for oil, and fields operating under primary recovery methods are producing at or near their maximum rates, greater emphasis is being placed on secondary recovery methods for increasing the available oil supply, Dr. Sayers said. The Appalachian fields produce oils containing high percentages of lubricants.

GAS REGULATION



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✓ **Ideal for venting gas-burning appliances**

✓ **Light weight—easy to install and support**

✓ **Can't Rust**

✓ **Needs no painting**

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✓ **Full range of sizes, 2" to 12"**

✓ **Complete line of Fittings and Accessories**

For details write for brochure TR-13A. Johns-Manville, 22 East 40th Street, New York 16, New York.

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JOHNS-MANVILLE
TRANSITE FLUE PIPE
For venting gas-burning appliances

"Gremlin Book" Tells Public and Employees About Gas

A plan for educating the public and gas company employees in proper installation of gas appliances and gas piping has been started by Lone Star Gas Co., Dallas, Texas, with publication of a book called the "Gremlin Book."

The publication is to be presented to architects, contractors, lumber yards and prospective home owners. In order to point out numerous mistakes which are made in locating gas outlets and gas appliances, the book uses the House Gremlin to dramatize right and wrong methods of installation. The Gremlin says: "If you don't plan right, I'll get you."

Officials of the company state that development of gas utilization in the company's territory has been haphazard and the effort now, with the approach of postwar building, is to induce people to really plan for home comfort. Emphasis is placed on installation of vented heating equipment to replace the numerous open flame unit room heaters which at present represent 80% of the house heating appliances.

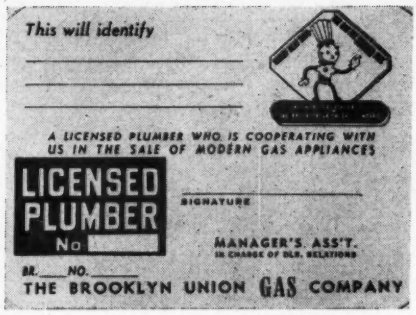
The book starts with kitchen plans showing some errors that are made when the builder fails to properly plan for kitchen appliances. Proper methods of venting water heaters are shown next. The largest section of the book is devoted to house heating and some of the misconceptions about this important element of the home. Six different methods of house heating are described and illustrated in detail, the illustrations being in color. Causes and prevention of wall sweating are explained.

The booklet is also to be used as a training manual for new salesmen who will be hired after the war. The publication was initiated by J. M. Lynn, Jr., assistant new business manager of the Dallas Division of Lone Star Gas Company, with the advertising department and other departments assisting in its development.

Norton-McCurray Official Perfects Tank Device

Several days before a critical engagement in the North African theater of war, Maj. Charles E. Norton, 46, vice president, Norton-McMurray Manufacturing Co., Chicago, was informed that a large quantity of ammunition on hand was unusable because of changes made in the bazooka, an anti-tank weapon, midway in the campaign.

In 48 hours after he took over, he had perfected a device which was almost immediately manufactured, whereby the ammunition became interchangeable in all types of the weapon. When contact was established with the enemy, 11,000 bazookas, which otherwise would have been useless, roared out to challenge Axis armor.


This will identify
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MANAGER'S ASS'T.
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THE BROOKLYN UNION GAS COMPANY

Licensed Plumbers Carry Identification Cards

In order to help the legitimate licensed plumber to make money in the gas appliance field, an attractive identification card, wallet size, has been designed by Brooklyn Union Gas Co. This will identify a licensed plumber cooperating with the Brooklyn Union in the sale of approved gas appliances.

During the past 15 years of cooperating with dealers in the sale of gas appliances, it can be shown that approximately 1000 plumbers a year file leads and sell or purchase equipment. In addition to this, all appliances sold by the company's sales organization must be connected by licensed plumbers. In order to accomplish this volume of business efficiently, an accurate record of the plumbers doing business with the company is of vital importance.

The identification card will do much to keep the unlicensed plumber from participating in the benefits of the cooperation plan. No one but a licensed plumber will be able to obtain one of these cards. It will show his license number and his signature.

FPC Considers Colorado Ownership Change

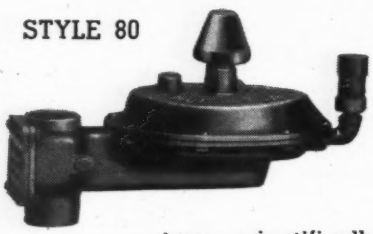
Kansas-Colorado Utilities, Inc., Lamar, Colo., has applied to FPC for authority to acquire and operate, at a cost of one million dollars plus inventory value of merchandise and supplies on hand, all The Central Gas Utilities Co.'s facilities in Baca and Prowers Counties, Colo., and Stevens, Staunton, Hamilton, and Grant Counties, Kans. The company will issue securities to finance the transaction.

The facilities, which will be operated as a single integrated system, will be used to serve gas consumers in Syracuse, Kansas, Lamar and Springfield, Colorado, and some 12 smaller Kansas and Colorado communities, as well as five industrial consumers located along the main transmission line.

Texas Commission Rules On Gas Commingling

The Texas Railroad Commission has denied the application of Coltexo Corp. for permission to commingle natural and casinghead gas in a pipeline serving a carbon black plant in Wheeler County. The company proposed to place the gases in the same pipeline, but to withdraw for legal oil lease purposes an amount equal to the intake of natural. Earlier this year, WPB unsuccessfully urged the Railroad Commission to authorize use of natural gas for making carbon black.

STYLE 80



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SHORTS

• The majority of American families expecting to build their own homes to order when restrictions are relaxed are budgeting $5500 or more for construction alone, exclusive of land cost, according to an F. W. Dodge Corp. survey of 18,428 families personally interviewed.

Fewer than 12% expect to obtain a home built to order for $4500 or less, exclusive of land costs; 16% expect to spend $9500 or more for dwelling construction.

• Petroleum Administrator for War Harold L. Ickes has recommended that a minimum of 27,000 oil and gas wells be drilled in 1945, of which 5000 should be exploratory wells. The 1945 program calls for 3000 more wells than were scheduled for 1944.

• Plans to reinject natural gas in an attempt to rejuvenate a 22-year-old oil pool which is now producing less than three barrels daily from each of its 202 wells were announced by the Arkansas Oil and Gas Commission. The experiment will be conducted in the Stephens field of Columbia, Nevada and Ouachita Counties. All operators in the field were invited to observe the results and if they look promising from a physical and economic standpoint, the commission will propose formation of a unit to repressure the entire field, Director Alec M. Crowell said.

• Last month Servel produced its 15,000th wing panel for the P-47 Thunderbolt. The first panel, made in July, 1942, required 12,334 manhours to build. The set of which this 15,000th panel will become a part required only 2334 manhours—an improvement in efficiency of 552%, according to Walter R. Campbell, superintendent of Servel's Wing division.

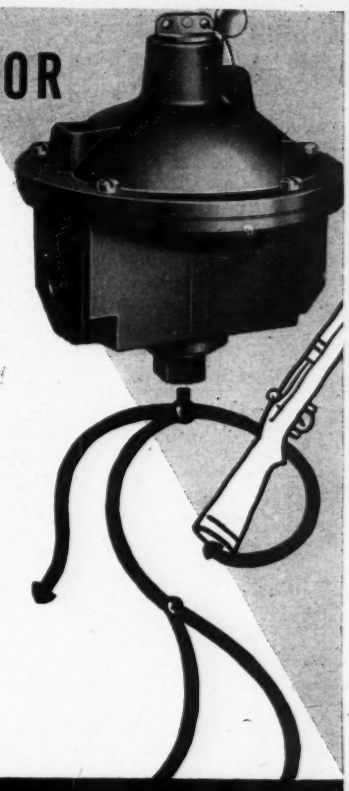
• Portland (Ore.) Gas and Coke Co.'s bills now carry in red the following advice to its consumers, "Buy War Bonds Now * A New "CP" Gas Range After Victory!"

• Keeping warm in winter and cool in summer will take two billion dollars out of the home owners pockets in the first five postwar years, according to a market forecast prepared by the Airtemp Division of Chrysler Corp.

• Dr. E. P. Schoch, University of Texas, believes that within three years he can prove the worth of an electric discharge process for making materials for plastics and other products from natural gas. Primarily concerned with gas conservation, Dr. Schoch hopes that research at the University will develop a method by which casinghead gas, now wasted in the production of oil, can be turned to useful channels.

• The Utah Supreme Court last month upheld a state public service commission order requiring Utah Power and Light Co., Ebasco subsidiary, to reduce its rates approximately 12%. The reduction was made retroactive to Oct. 15, 1943, and will save consumers $1,504,-044 annually.

STANDING GUARD FOR
LONG LIFE



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STREET CITY ZONE STATE

Providence Man Wins Kitchen Naming Contest

First prize of a $500 War Bond went to Everett A. Taylor, purchasing agent, Providence Gas Co., R. I., for his title, "New Freedom Gas Kitchen," in the nationwide A.G.A. - A.G.A.E.M. sponsored kitchen naming contest, which closed on Sept. 10.

Entitled "Wanted—A Name for the Gas Industry's Glamorous New Coordinated Kitchens," the contest offered a total of $1800 in War Bonds. The winning title, the judging committee felt, most nearly met the forthcoming demands of national advertising scheduled for 1945. The Coordinated Kitchen Program, originally set up by the Postwar Planning Committee, headed by Alexander Beebe, Rochester Gas & Electric Corp., and supervised by C. V. Sorenson, Northern Indiana Public Service Co., is at present directed by H. Vinton Potter.

Second and third prizes of $100 War Bonds were awarded, respectively, to R. W. Hudgen, Oklahoma Natural Gas Co., Tulsa, for "Modern Age Gas Kitchen," and Lloyd Ira Miller, Pennsylvania Power & Light Co., Allentown, Pa., for "Gas Maid Kitchen." In addition, $100 War Bonds were given for the best name selected from each of the nation's geographical regions, plus one for Canada and two prizes at large.

The contest drew many more entries than had been anticipated—entries of various and sometimes especially coined words, which made judging extremely difficult. The committee of judges consisted of: John H. Warden, chairman, general sales manager, Oklahoma Natural Gas Co., Tulsa; Jeanette Campbell, home service director, Minneapolis Gas Light Co., Minneapolis; Robert S. Agee, vice president, Roberts and Mander, Hatboro, Penn.; and Lloyd Ginn, sales promotion manager, American Stove Co., Cleveland.

San Diego Offers Employees Incentive Wage Plan

In an unusual war incentive wage raise, the San Diego Gas & Electric Co. has agreed to offer its 1200 employees a 4% blanket increase to remain in effect as long as the company gross revenues exceed $15,000,000 annually.

Subjet to approval of the War Labor Board, the agreement was negotiated with the A. F. L. Brotherhood of Electrical Workers Local B-465 by E. D. Sherwin, vice-president in charge of operations, and L. M. Klauber, vice-president and general manager. Current annual income is almost $16,000,000, Klauber said.

Although the contract applies only to the 900 workers under the union's jurisdiction, the company has voluntarily asked the WLB to approve similar raises for the remainder of its employees.

A union demand for an 8% wage increase last year was successfully opposed by the company, whose position was backed by the WLB. The government agency, instead, allowed pay of a few workers who were receiving less than 80c an hour to be raised to that minimum.

New Company Formed From Southern Union Properties

Southern Union Gas Co., owner of gas distributing systems in Belleville, Brenham, Columbus, Eagle Lake, Hempstead, Navasota, Prairie View, Sealy and Waller, Texas, has announced the incorporation of these properties into a new company to be known as the Texas Southeastern Gas Co., a Texas corporation. The incorporation of the Texas Southeastern Gas Co. results from the agreement made by Southern Union Gas with the Securities and Exchange Commission for disposal of its distribution system in South Texas

Construction Backlog at $10.5 Billion Mark

The backlog of construction projects awaiting the relaxation of government controls and the availability of manpower and building materials exceeds 10½ billion dollars, it was reported recently by F. W. Dodge Corp., fact-finding organization for the construction industry.

School and college buildings, hospital buildings, manufacturing, loft and office buildings and churches—in the order listed—are the principal non-residential classifications reported. The backlog of school and college buildings alone amounted to $767,930,000, and all non-residential building to $2,676,373,000.

In the residential field, Dodge reported a backlog of slightly less than a half billion dollars for one-family dwellings to be built for owners to order and by operative builders for sale or rent. The total of residential building, including apartment houses, dormitories and hotels, was $1,032,066,000.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of *GAS*, published monthly at Los Angeles, California, for October 1, 1944.

State of California, County of Los Angeles—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Jay Jenkins, who, having been duly sworn according to law, deposes and says that he is the publisher of the *GAS* and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Jay Jenkins, 1709 W. 8th St., Los Angeles 14, Calif.

Managing editor, Arthur Rohman, 1709 W. 8th St., Los Angeles 14, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

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George H. Finley, Santa Barbara, Calif.
Arthur Rohman, Los Angeles, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is..... .....(This information is required from daily publications only.)

JAY JENKINS,
Publisher.

Sworn to and subscribed before me this 27th day of September, 1944.

(Seal) SUSAN McCONNELL

(My commission expires June 4, 1947.)

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